DOCUMENT RESUME

ED 031 059 EF 003 466

Student Housing Cost Study.
California Univ., Berkeley. Univ. Residential Building System.
Spons Agency-Educational Facilities Labs., Inc., New York, N.Y.
Report No-URBS-Pub-3
Pub Date Oct 67
Note-131p.
EDRS Price MF-$0.75 HC-$6.65
Descriptors-Air Conditioning, *Building Design, Building Materials, *College Housing, *Component Building Systems, *Construction Costs, Dormitories, Equipment, Estimated Costs, Flooring, Furniture Arrangement, Heating, Interior Space, Plumbing, Research Projects, Single Students, *Structural Building Systems, Ventilation

Target costs for the University Residential Building System (URBS) Project of the University of California are presented. Findings depict the effectiveness of building design and material applications and should be useful in guiding future student housing design work, whether the design utilizes the URBS system or not. Ten recently constructed single-student residence halls on seven of the nine campuses of the University of California were selected for analysis. These buildings were grouped by types of construction as defined in the Uniform Building Code. Only residential areas, including related study rooms, lounges, toilet rooms, lobbies, and public circulation areas were included in the study. Costs as stated include only those required for construction of the residence hall building itself. The study method was to estimate the cost of buildings from the working drawings, specifications and change orders as if each project were bid for construction in the San Francisco Bay Area in January 1966. (RK)

ED031059

OCTOBER 1967

URBS PUBLICATION 3

# STUDENT HOUSING COST STUDY

EF003466

UNIVERSITY RESIDENTIAL BUILDING SYSTEM
A Project of the UNIVERSITY OF CALIFORNIA

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL OFFICE OF EDUCATION POSITION OR POLICY.

# UNIVERSITY RESIDENTIAL BUILDING SYSTEM

A Project of

THE UNIVERSITY OF CALIFORNIA

Office of the Vice President,
Physical Planning and Construction
641 University Hall
Berkeley, California 94720

Project Director: R. Clayton Kantz, AIA
Asst. Project Director: Wm. A. Kinst, AIA

CONSULTANT
Building Systems Development, Inc.
Ezra Ehrenkrantz, President
120 Broadway
San Francisco, California

This Project Supported By

EDUCATIONAL FACILITIES LABORATORIES, INC.
New York, New York

# UNIVERSITY RESIDENTIAL BUILDING SYSTEM

## THE UNIVERSITY OF CALIFORNIA

## THE NATIONAL ADVISORY COMMITTEE

Robert R. Evans: (Chairman) Acting Vice President - Physical Planning and Construction, The University of California

Louis T. Benezet: President, The Claremont Graduate School and University Center

Frank Burrows: Partner, Williams and Burrows, Inc., General Contractors

Paul Emmert: Executive Secretary for Program Policy Review Board; Community Facilities Administration; formerly head of San Francisco office of HHFA

Robert L. Geddes: Dean, School of Architecture, Princeton University

Cornelius J. Haggerty: President, Building and Construction Trades Department AFL-CIO; formerly a Regent of the University of California

William LeMessurier: Owner, LeMessurier and Associates, Structural Engineers; Professor of Structural Engineering at Massachusetts Institute of Technology

Elmo R. Morgan: Deputy Assistant Secretary of Interior

Donald E. Neptune: Partner, Neptune and Thomas, Architects; past President, California Council, The American Institute of Architects

Walter Andrew Netsch: General partner, Skidmore, Owings and Merrill, Architects

Theodore Newcomb: Professor of Psychology, The University of Michigan

Fred A. Schwendiman: Director of Auxiliary Services, Brigham Young University; past President, Association of College and University Housing Officers

Robert Shaffer: Dean of Students, The Indiana University; regional President, National Association of Student Personnel Administrators

Jonathan King: Vice President and Treasurer, Educational Facilities Laboratories, Inc.

## UNIVERSITY OF CALIFORNIA
## COMMITTEE ON RESIDENCE HALLS

### Current

William F. Shepard: (Chairman) Assistant Vice President and University Dean, University-Wide
John Stanford: Director of Business Services, University-Wide
Adolph T. Brugger: Dean of Students, Riverside
Louis A. DeMonte: Campus Architect, Berkeley
Ray Varley: Vice Chancellor, Business Affairs, Santa Barbara
Ira Fink: University Community Planner, University-Wide
Ted D. Johnson: (Secretary) Assistant Director of Relations to Schools, University-Wide
R. Clayton Kantz: Director, URBS, University-Wide
John R. Kropf: Residence Hall Administrator, Los Angeles
Oscar Norr: Manager of Auxiliary Enterprises, San Diego
Van R. Richards: Dean of Students, Davis
Byron Stookey: Assistant to Chancellor, Santa Cruz
Myles E. Tobin: Assistant Business Manager, San Francisco
Arleigh Williams: Dean of Students, Berkeley
James G. Wilson: Business Manager, Irvine

### Former

Byron Atkinson: Dean of Students, Los Angeles
Robert S. Downie: Assistant Vice Chancellor, Business Affairs, Davis
Theodore Forbes: Dean of Student Affairs, San Diego
Charles Halberg: Vice Chancellor, Student Affairs, Riverside
Lyle G. Reynolds: Dean of Students, Santa Barbara
Scott Wilson: Residence Halls Administrator, Berkeley

# PREFACE

The primary purpose of this Cost Study was the determination of target costs for the University Residential Building System (URBS) Project of the University of California. A major corollary benefit is that the findings depict the effectiveness of building design and material applications. This should be useful in guiding future student housing design work, whether the design utilizes the URBS system or not.

We are indebted to many for assistance in the collection, verification and compilation of data. Special appreciation is directed to:

Fred A. Schwendiman, Director of Auxiliary Services,
Brigham Young University, Provo, Utah
Frank F. Burrows, Williams & Burrows, Inc., General
Contractors, Belmont, California

and among the many for the University of California, at the:

Berkeley Campus: A. Beach Becker and Edward B. Hendricks
Davis Campus: James P. Phillips
Irvine Campus: Mrs. Ellene J. Sumner and R. E. Figley
Los Angeles Campus: Harland D. Harris and John R. Kropf
Riverside Campus: Lloyd R. Jones
San Diego Campus: Oscar W. Norr
Santa Barbara Campus: C. C. Tucker and Arthur C. Roe
Santa Cruz Campus: Jerome B. Walters

Mr. Visscher Boyd, AIA, coordinated the study for the consultant, Building Systems Development, Inc., San Francisco.

R. Clayton Kantz
Project Director

# TABLE OF CONTENTS

PURPOSE OF THE COST STUDY .............................. 1
THE STUDY METHOD 3
THE PROJECTS 7

BUILDING COSTS AND COMPONENT COSTS ..................... 29
COMPONENT CATEGORIES

BELOW GRADE AND GROUND FLOOR ....................... 31
FLOOR 43
ROOF 55
INTERIOR PARTITIONS ................................ 67
INTERIOR GENERAL 79
EXTERIOR SKIN 91
HEATING, VENTILATING AND AIR CONDITIONING.......... 103
PLUMBING 115
ELECTRICAL 117
ELEVATORS .......................................... 119

BATHROOM COST PER STUDENT .............................. 120

STUDY-BEDROOM FURNISHINGS PER STUDENT .................. 121

## PURPOSE OF THE COST STUDY

The objective of this Cost Study was three-fold:

1. To develop the framework for study and analysis effort,
2. To establish the target costs for the components to be generated by the University Residential Building System Project,
3. To compile data on maintenance and operating costs applicable in the later evaluation of the components.

The Cost Study further records experience with materials and building products recently used in the construction of student housing at the University of California.

The Cost Study was conducted between June, 1966 and June, 1967 concurrently with the preparation of the Performance Specifications for the University of California's URBS (University Residential Building System) Project.

The University Residential Building System Project proposes the development of a building system comprising five components. These are:

Structure-Ceiling
Heating, Ventilating, and Cooling
Partitions
Bathrooms
Furnishings

These five components will be incorporated in a student housing program for a minimum of 4,500 students. The types of housing will be varied-- ranging from low-rise to high-rise buildings, providing for undergraduate as well as graduate students, including facilities for both the single student and the married student. Bid proposals for the components are scheduled for submission on April 2, 1968. Contracts for the components will then be awarded, followed by development work and extensive testing of the components. The accepted components will then be used in the design of student housing facilities at the several campuses of the University of California. The design work will be performed by architects in private practice, as selected by each campus. The new student housing facilities will open for occupancy between September, 1970 and September, 1973.

This Cost Study selected ten recently completed student housing projects for analysis. These projects reflect as great a variety as currently exists on the nine campuses of the University of California. Married student housing was not included in the group of ten. This was due to the units being adaptations of war-time housing in most cases; the very few newer units were of a lower construction standard than is contemplated for the URBS student housing projects.

Early in the development of the URBS Project, it became evident that there would be difficulty in the formulation of accurate cost data directly applicable to the specific needs of the Project. Current records are not effective in isolating the costs of housing, only, from the costs of other related construction such as kitchen, dining, central commons, parking structures and site improvements. The construction contracts rarely were restricted to the housing portions only, nor did general contractors' cost breakdowns isolate them with any degree of accuracy. It was then determined to conduct the Cost Study in such a manner that precise data would be formulated relating specifically to the housing portions alone.

In this respect, the Cost Study has been eminently successful.

Not as successfully completed is the data on operating and maintenance costs. This is because very little conclusive material could be developed. The principal reasons for this are:

1. The relatively recent date of construction of the projects studied,
2. Most of the adjustment and maintenance effort during the first year of occupancy was the responsibility of the contractor for the Project,
3. Metering devices on several projects proved to have inconsistent and erratic performance,
4. The degree and method of record keeping was inconsistent both among campuses and within a single campus.

Despite these problems, sufficient experience was contributed to enable the establishment of broad classifications. These are expressed in this study.

## THE STUDY METHOD

Ten recently constructed single-student residence halls on seven of the nine campuses of the University of California were selected for detailed cost analysis. These buildings were grouped by Types of Construction as defined in the Uniform Building Code. Five of the residence halls are of Type I (fire-proof) construction, two are of Type III (masonry exterior wall), and three are of Type V (wood frame) construction. In this analysis, the Type I buildings are considered as a group, the Type III and V buildings as a separate group. In general, Type I construction is required for high-rise buildings whereas the other types are restricted to a maximum of three or four stories.

Only residential areas, including related study rooms, lounges, toilet rooms, lobbies and public circulation areas, have been included in this study. Dining halls, kitchens, and their related services have not been included. In those facilities where dining halls were physically combined with residence halls, a design revision has been assumed which eliminates the dining hall and kitchen portions.

Costs stated herein include only those required for construction of the residence hall building itself. General site preparations, landscaping, furnishings, project administrative and financing charges, paving and utilities outside of the building site have not been included. When, however, utility tunnels, vaults and service buildings are within the project site and serve only the residence halls, their costs have been included. Calculations of area were taken from the construction drawings and then checked with University data sheets for OGSF (outside gross square feet) and ASF* (assignable square feet).

The study method was to estimate the cost of buildings from the working drawings, specifications and change orders as if each project were bid for construction in the San Francisco Bay Area in January, 1966. Bay Area labor costs, material costs and working conditions were assumed throughout. The site in each case was assumed to be of approximately similar contour to the rough grade of the building site, with a soil bearing value of two tons per square foot six feet below the surface. Footing types were estimated as constructed.

The estimates were then compared with the actual construction contract figures for each project, adjusted to the time and conditions described above. The estimates varied from the adjusted original contract figures less than 3% for any project.

The Engineering News-Record Construction Cost Index for January, 1966 is 988, the Building Cost Index is 635. These indexes, along with the up-dating of unit costs in each specific area will be utilized in establishing final target costs for the URBS components.

Constructional costs are allocated to the following ten categories:

1. Below Grade and Ground Floor
2. Floor System

---

*Assignable Square Feet as determined by University definition and excluding public corridors, stairs, and lobbies.

3. Roof System
4. Interior Partitions
5. Interior General
6. Exterior Skin
7. Heating, Ventilating and Air-Conditioning
8. Plumbing
9. Electrical
10. Elevators

Elements of each component have been estimated by the quantity survey method utilizing Marshall-Stevens, Means, Dodge and Walker manuals, along with extensive consultation with local sub-contractors and material suppliers. Plumbing and heating, ventilating and air-conditioning costs have been estimated in consultation with Simonson & Simonson, Mechanical Engineering, Consultants to Building Systems Development, Inc., for the URBS Project. Allowances have been used only for electrical work and elevator installations.

Each material application has been considered as an element of one of the categories listed above.

Administrative overhead of 10% and a General Contractors' profit of 5% have been added to the cost of each category to establish general contract costs. The cost of each element in five of the categories (Below Grade, Floor, Roof, Partitions, and Exterior Skin) is related to the square footage of the basic category of which it is a part, rather than to its own cost-per-square foot, so that comparisons of basic categories may be readily made. For example, the diagram of a floor system of 60,000 square feet will indicate Ceramic Floor Tile at $0.23 per square foot, meaning that the cost of the quantity of Ceramic Floor Tile included in this category for this building totaled $0.23 x 60,000 = $13,800.00.

Because of their more general character, however, the categories of Interior General (attachments such as mirrors, book shelves, toilet partitions, wardrobes), Heating-Ventilating and Air-Conditioning, Plumbing, Electrical, and Elevators are related to outside gross square feet.

Total costs and unit costs of each element for each category have been tabulated and illustrated for the ten projects studied. Those elements which would be a part of, or replaced by an URBS component have been extracted and tabulated separately. This was done to establish the value of the URBS components in future similar buildings. However, excluded from this procedure are those elements of furniture not normally a part of the General Construction Contract, but which will be bid under the URBS Performance Specifications. These items, classified as Group 2 and 3 equipment by the University, vary somewhat from project to project. For example, in two projects the bed frames were included along with desks and storage units in the Construction Contract. In another project desk-files were also included. The total tabulated under Furnishings in this study therefore, reflects only those storage elements, wardrobes, light fixtures, book shelves and similar elements which were included in the General Construction Contract for each project, and not the complete scope of URBS furnishings.

Custodial maintenance and operating costs were investigated through structured interviews with housing managers and auxiliary services staff at each of the campuses involved. Factual data and experiences were collected to compile a case study of each building. Further assistance in general areas of maintenance and custodial cost was received from a survey of Intermountain Housing Officials. This survey was conducted for URBS by Fred A. Schwendiman, Director of Auxiliary Services, Brigham Young University, Provo, Utah.

The data concerning custodial and maintenance costs has been used to establish broad areas of related costs. It has been applied to the diagrams of the category elements on the basis of reported experience with specific materials in completed installations.

Custodial Costs are those resulting from work performed by custodial employees to preserve the cleanliness, appearance, and operating efficiency of the building. The frequency of custodial care of elements varies according to campus policies. For example, some single-student bedrooms are cleaned once a week; others, only once per term. Bathroom cleanliness is maintained by the staff in all of the ten halls studied. There are instances on other campuses where this is a student resident responsibility.

The category diagrams indicate the reported degree of custodial care by code:

H = Heavy custodial care. Subject to attention at least once a week during the normal operating period of the building.

L = Light custodial care. Subject to attention less frequently, but at least quarter-annually.

Maintenance Costs are expenditures required to service, repair or replace materials or equipment. Examples include replacement of air filters and painted surfaces (often subject to programmed maintenance), hardware and broken glass replacement (resulting from wear or failure), inspection, lubrication, and correction of design and installation deficiencies.

The category diagrams indicate the reported degree of maintenance costs by code:

H = Heavy maintenance cost. In excess of 5% of replacement cost per year.

L = Light maintenance cost. Less than 5% of replacement cost per year.

Note that 5% per year replacement cost is also considered the equivalent of 20-year life expectancy.

Operating Costs consist of utility charges, the larger part of which is attributable to heating and cooling costs.

The reported degree of operating costs by code:

H = High operating cost. Utility charges exceed $25.00 per student per 36-week academic year.

L = Light operating cost. Utility charges less than $25.00 per student per 36-week academic year.

THE PROJECTS

The following are the ten projects whose construction costs have been analyzed. The five Type I projects are:

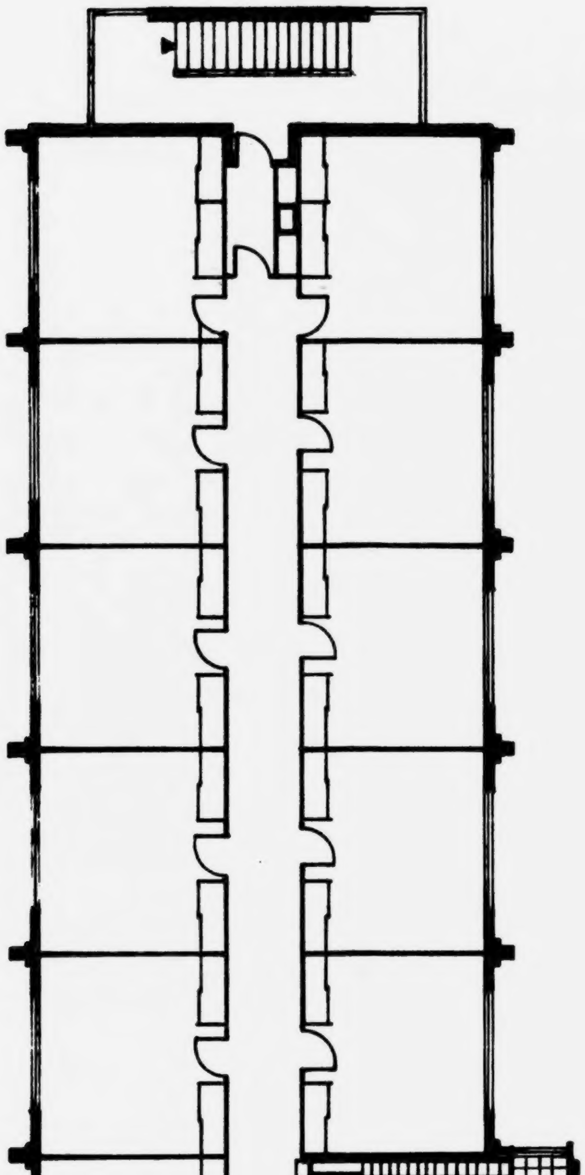
| | |
|---|---|
| Residence Hall #3<br>Priestly Hall<br>BERKELEY | $21.94 per OGSF, $4102 per resident |
| Residence Hall #5<br>Ryerson Hall<br>DAVIS | $21.65 per OGSF, $4669 per resident |
| Residence Hall #4<br>Hedrick Hall<br>LOS ANGELES | $21.04 per OGSF, $4178 per resident |
| Residence Hall #4<br>Lothian Hall<br>RIVERSIDE | $20.94 per OGSF, $3894 per resident |

The five Type III and Type V projects are:

| | |
|---|---|
| Residence Hall #6<br>Regan Hall<br>DAVIS<br>(Type V) | $16.09 per OGSF, $3181 per resident |
| Residence Hall #1<br>Mesa Court<br>IRVINE<br>(Type V) | $16.89 per OGSF, $3452 per resident |
| Residence College #1<br>Cowell College<br>SANTA CRUZ<br>(Type III) | $18.78 per OGSF, $4040 per resident |
| Residence College #3<br>Crown College<br>SANTA CRUZ<br>(Type V) | $18.66 per OGSF, $4008 per resident |
| Residence Hall #2<br>Anacapa Hall<br>SANTA BARBARA<br>(Type III) | $19.83 per OGSF, $3542 per resident |

Note that there is considerable overlap between the two groups with respect to cost per student resident. The less expensive type of construction does not necessarily produce the lower capital investment. This is, in part, a reflection of the efficiency of space utilization within the building. This efficiency is expressed as the ratio of A.S.F. (Assignable Square Feet) to O.G.S.F. (Outside Gross Square Feet).

The following pages illustrate the typical residence floor plan and provide data for each project. The ENR index used is the Construction Cost Index.



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #3, Priestly Hall, BERKELEY

Residence Hall #3, Priestly Hall, BERKELEY

Priestly Hall, for single students, is in a complex of four residence halls with a central dining commons. This is the third complex at Berkeley using the same basic design. Priestly Hall was selected for analysis because it is structurally independent of the other buildings. It is a nine-story structure with reinforced concrete frame and exterior walls, and has one elevator. The residence floors have a double-loaded corridor plan with two-student study-bedrooms. A large gang-bath facility serves each floor. A study lounge is located on alternate floors. The first floor consists of a large lounge, offices, and head-residents' apartment.

The complex was occupied in the fall of 1963.
The architect was John Carl Warnecke and Associates, San Francisco.

DATA: Outside Gross Square Feet = 40,000

Assignable Square Feet = 26,500

Efficiency Ratio (ASF/OGSF) = .66

Resident Students = 214

OGSF per resident student = 187

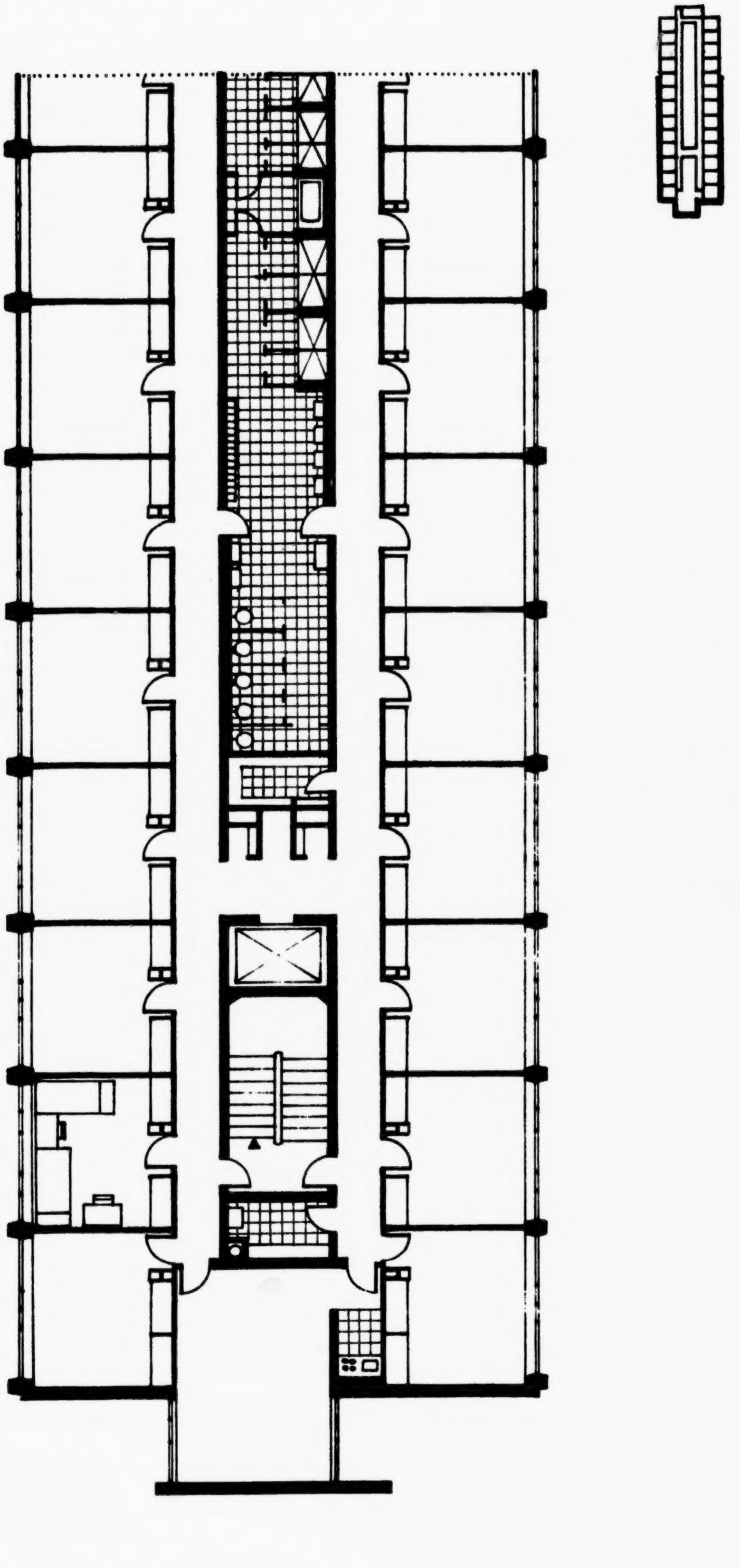
ASF per resident student = 124

Building Construction Cost (ENR = 988) = $877,770

Building Construction Cost per OGSF = $21.94

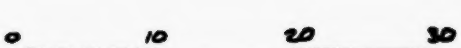
Building Construction Cost per resident student = $4,102

At time of bid, October, 1961, ENR = 855



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #5, Ryerson Hall, DAVIS



## Residence Hall #5, Ryerson Hall, DAVIS

Ryerson Hall, for single students, is in a complex of four residence halls. The other three buildings are the same design. This hall is a five-story, reinforced concrete structure with one elevator. The plan provides primarily two-student rooms.

The ground floor contains a large social lounge, library and head residents' apartment. The four upper floors are similar, containing the student bedrooms and study lounges. Their floor plan is a linear core plan.

The gang-type bath and laundry facilities are contained within interior concrete bearing walls, and are separated from the student rooms by corridors on either side of the core. On these floors the concrete floor slab serves as ceiling for the rooms below, except within the core.

Forced air is supplied to the interior core areas only. All bedrooms and study lounges are heated and cooled by individual fan-coil units.

At the time Ryerson Hall was constructed, some additions to the central dining commons as well as provisions for extension of its heating and cooling system to other buildings were included. The URBS analysis does not include these additions and extensions.

Ryerson Hall was occupied in the fall of 1963.
The architect was Kitchen and Hunt, San Francisco.

DATA: Outside Gross Square Feet = 44,000

Assignable Square Feet = 26,482

Efficiency Ratio (ASF/OGSF) = .66

Resident Students = 204

OGSF per resident student = 126

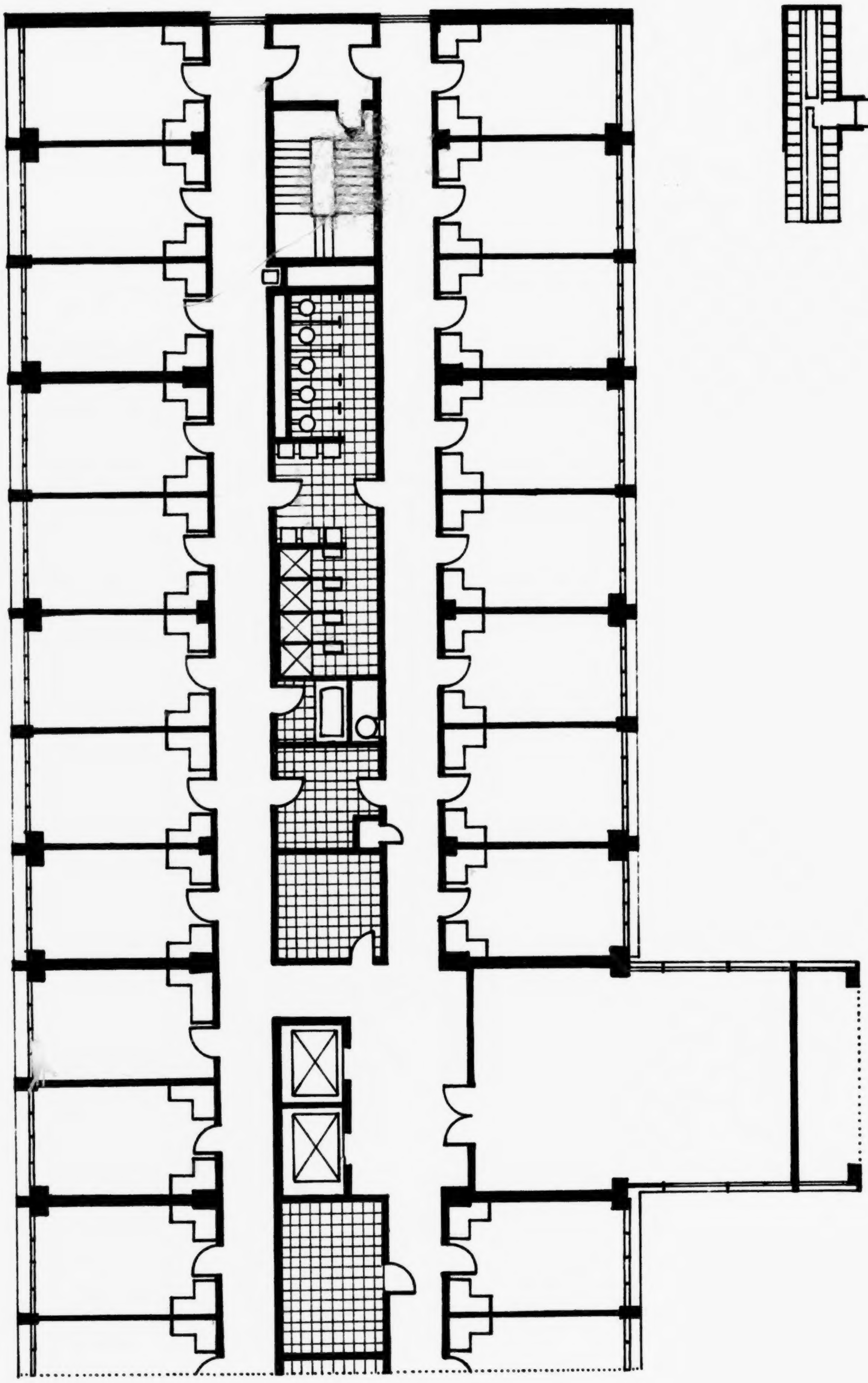
ASF per resident student = 130

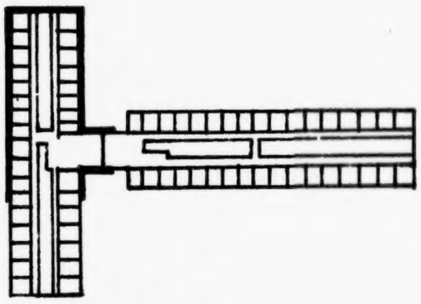
Building Construction Cost (ENR = 988) = $952,560

Building Construction Cost per OGSF = $21.65

Building Construction Cost per resident student = $4,669

At time of bid, August, 1961, ENR = 854





TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #4, Hedrick Hall, LOS ANGELES

Residence Hall #4, Hedrick Hall, LOS ANGELES

Hedrick Hall is the largest of the ten projects. It is the fourth building of its type constructed on this campus. The building consists of two seven-story residence towers arranged in a T-shape, the dining hall and kitchen facilities are under one, the main floor lounges and head residents' apartments are under the other. The hall incorporates refinements developed from previous projects. Student rooms were exceptionally well furnished within the building contract.

The structure is reinforced concrete. Two elevators serve the residence floors which contain a central linear core for the gang-bath, laundry and service facilities. The hall has a forced air heating and ventilating system serving all of the student rooms.

The large dining hall and kitchen facilities have been omitted from this analysis.

Hedrick Hall was occupied in September, 1964.
The architect was Welton Becket and Associates, Los Angeles.

DATA: Outside Gross Square Feet = 166,000

Assignable Square Feet = 102,000

Efficiency Ratio (ASF/OGSF) = .61

Resident Students = 836

OGSF per resident student = 198

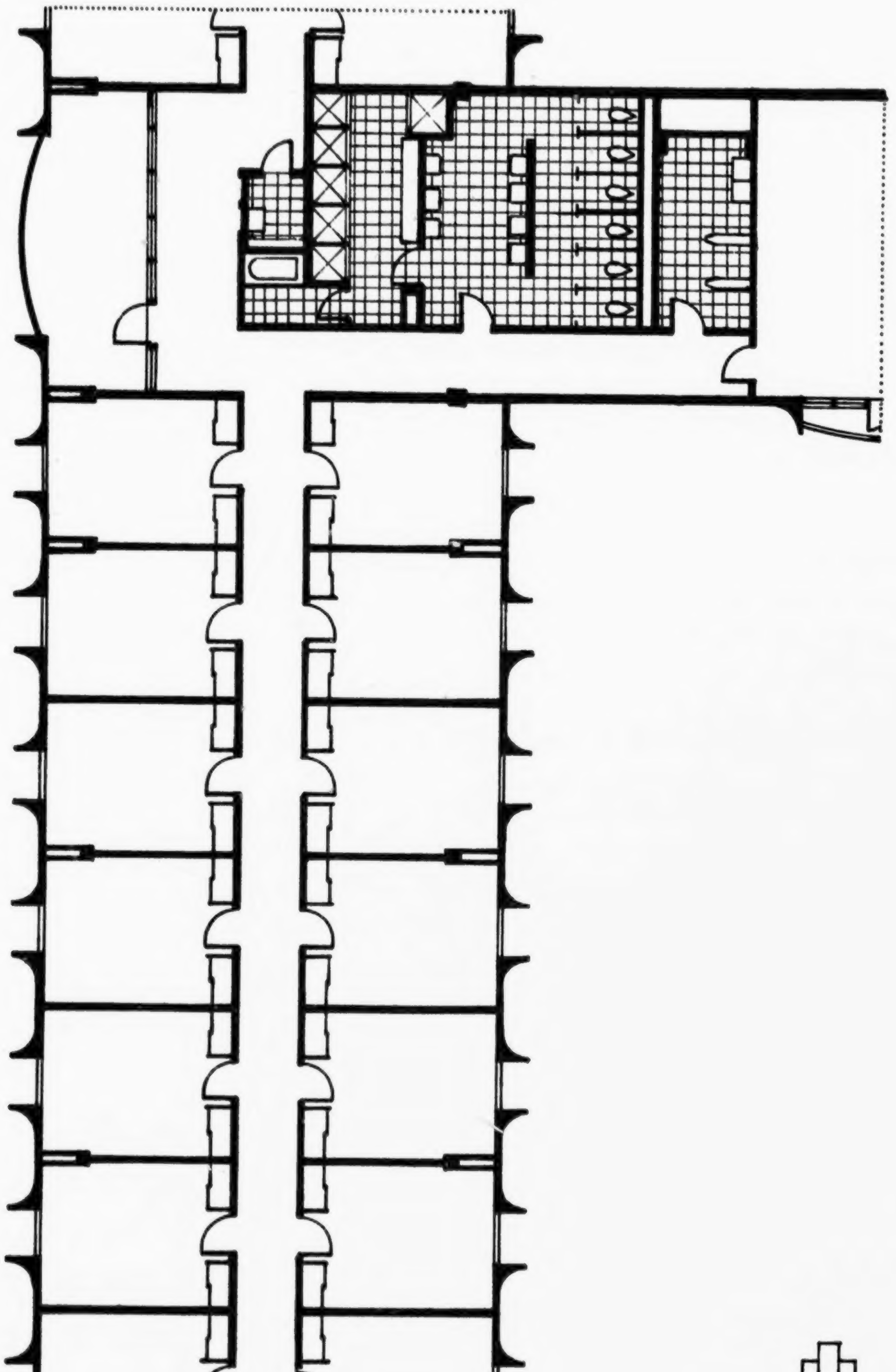
ASF per resident student = 122

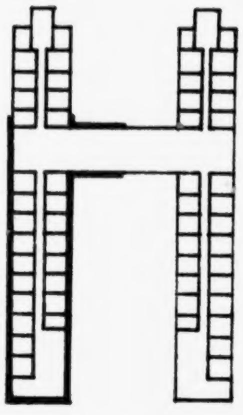
Building Construction Cost (ENR = 988) = $3,493,380

Building Construction Cost per OGSF = $21.04

Building Construction Cost per resident student = $4,178

At time of bid, January, 1962, ENR = 854.





TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #4, Lothian Hall, RIVERSIDE

## Residence Hall #4, Lothian Hall, RIVERSIDE

Lothian Hall is a four-story building with a partial basement, and is connected to a dining commons and kitchen. The residence floors form an H-shape plan arranged in the double-loaded corridor configuration. Most of the rooms are for two students. The dining commons and kitchen wing have provision for additional future dining facilities. All dining-kitchen facilities have been omitted from this analysis. Gang-baths are provided for each wing.

The building is of lift-slab concrete floor construction carried on steel columns. The exterior walls are pre-cast concrete. Horizontal forces are resisted by interior Gunite concrete walls.

The entire complex is air-conditioned by means of high-speed air induction units. Two elevators serve the residence floors.

The complex was occupied in September, 1963.
The architect was George Vernon Russell, Los Angeles.

DATA: Outside Gross Square Feet = 69,600

Assignable Square Feet = 45,750

Efficiency Ratio (ASF/OGSF) = 0.66

Resident Students = 422

OGSF per resident student = 165

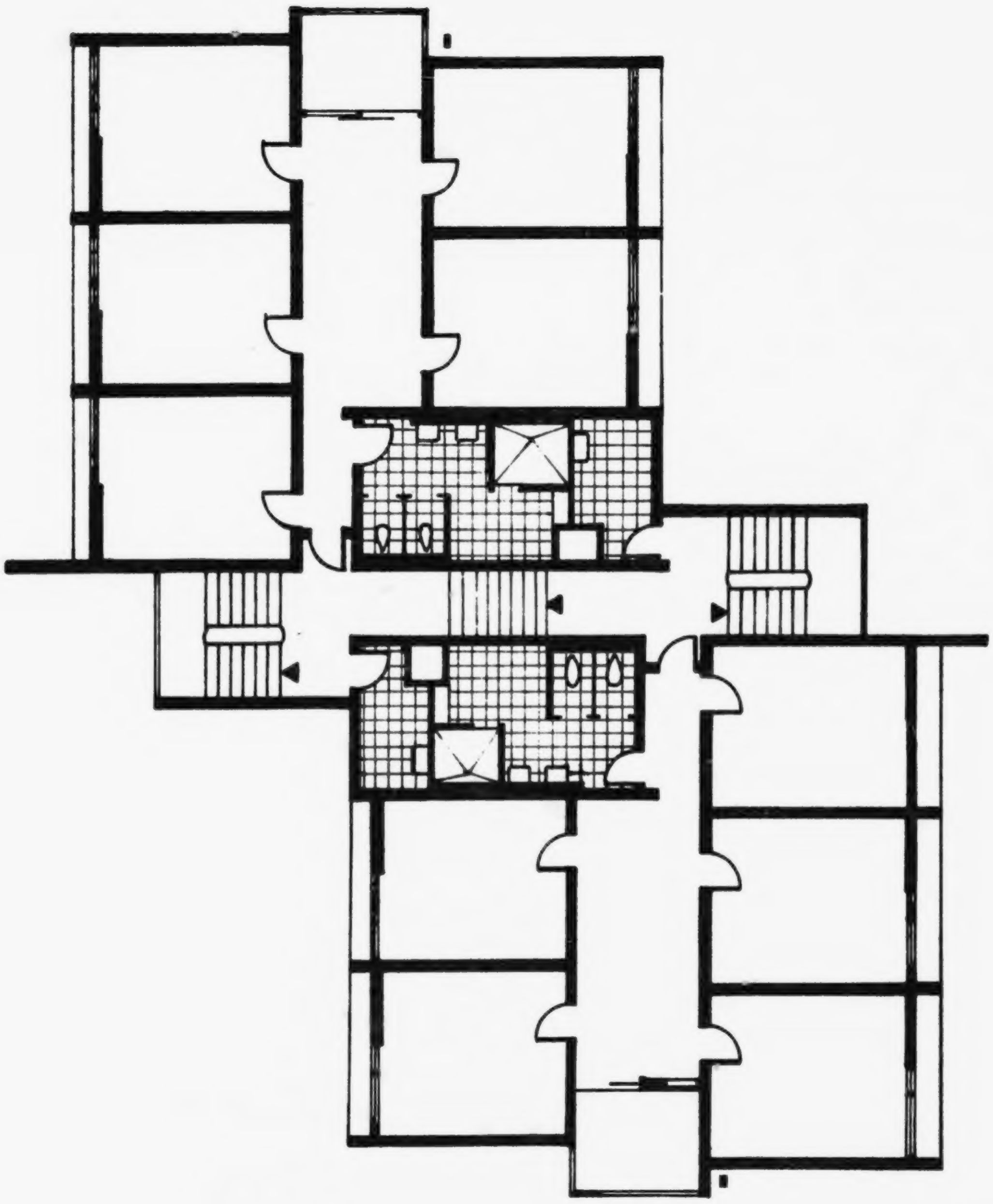
ASF per resident student = 108

Building Construction Cost (ENR = 988) = $1,535,400

Building Construction Cost per OGSF = $22.06

Building Construction Cost per resident student = $3,638

At time of bid, December, 1961, ENR = 855



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #1, Revelle Hall, SAN DIEGO

Residence Hall #1, Revelle Hall, SAN DIEGO

Revelle Hall is a complex of six residence buildings adjoining a large kitchen and dining commons in a separate structure. Each of the residence buildings is a four-story, split level tower without elevator. The student rooms are arranged in suites of five double rooms using a study lounge for circulation. Each suite has its own bathroom. The beds, desks, and storage units for each room were a part of the General Construction Contract. Each of the six buildings has a social lounge and resident assistants' apartment on the ground floor.

The six residence buildings are of concrete block bearing wall construction, with floors and roof slab of pre-cast concrete and cast in place of concrete. Heating is by hot water convectors. The buildings are serviced with space heating and domestic hotwater from a plant located in the adjacent dining commons.

Revelle Hall was open for occupancy in September, 1965.
The architect was Robert E. Alexander, Los Angeles.

DATA: Outside Gross Square Feet = 82,200

Assignable Square Feet = 48,350

Efficiency Ratio (ASF/OGSF) = 0.59

Resident students = 442

OGSF per resident student = 186

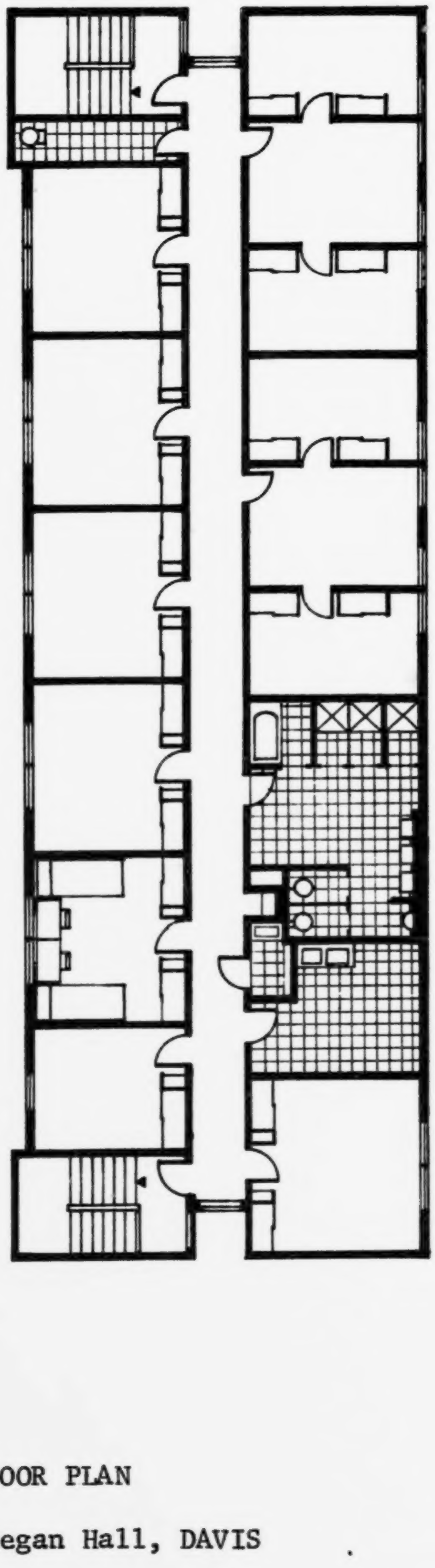
ASF per resident student = 109

Building Construction Cost (ENR = 988) = $1,721,270

Building Construction Cost per OGSF = $20.94

Building Construction Cost per resident student = $3,894

At time of bid, August, 1964, ENR = 948



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #6, Regan Hall, DAVIS

## Residence Hall #6, Regan Group, DAVIS

Residence Hall No. 6, for single students, is a group of seven two-story and three-story residence buildings of UBC-Type V construction. A central building contains the main lounge, offices and library. Each residence building is of the double room, double-loaded corridor plan configuration, with a limited number of spaces providing for four students in three rooms (two bedrooms plus a central study room). A gang-bathroom is provided on each floor. Heating and cooling are provided by individual fan-coil units in each room.

The complex as bid included an addition to an existing dining commons. This addition has been omitted from the URBS analysis. A small mechanical building for heating and chilled water equipment for the complex was a part of the bid, and has been included in the URBS cost analysis.

The complex was occupied in September, 1964.
The architect was Kitchen and Hunt, and John Funk; San Francisco.

DATA: Outside Gross Square Feet = 83,000

Assignable Square Feet = 60,000

Efficiency Ratio (ASF/OGSF) = .72

Resident Students = 420

OGSF per resident student = 198

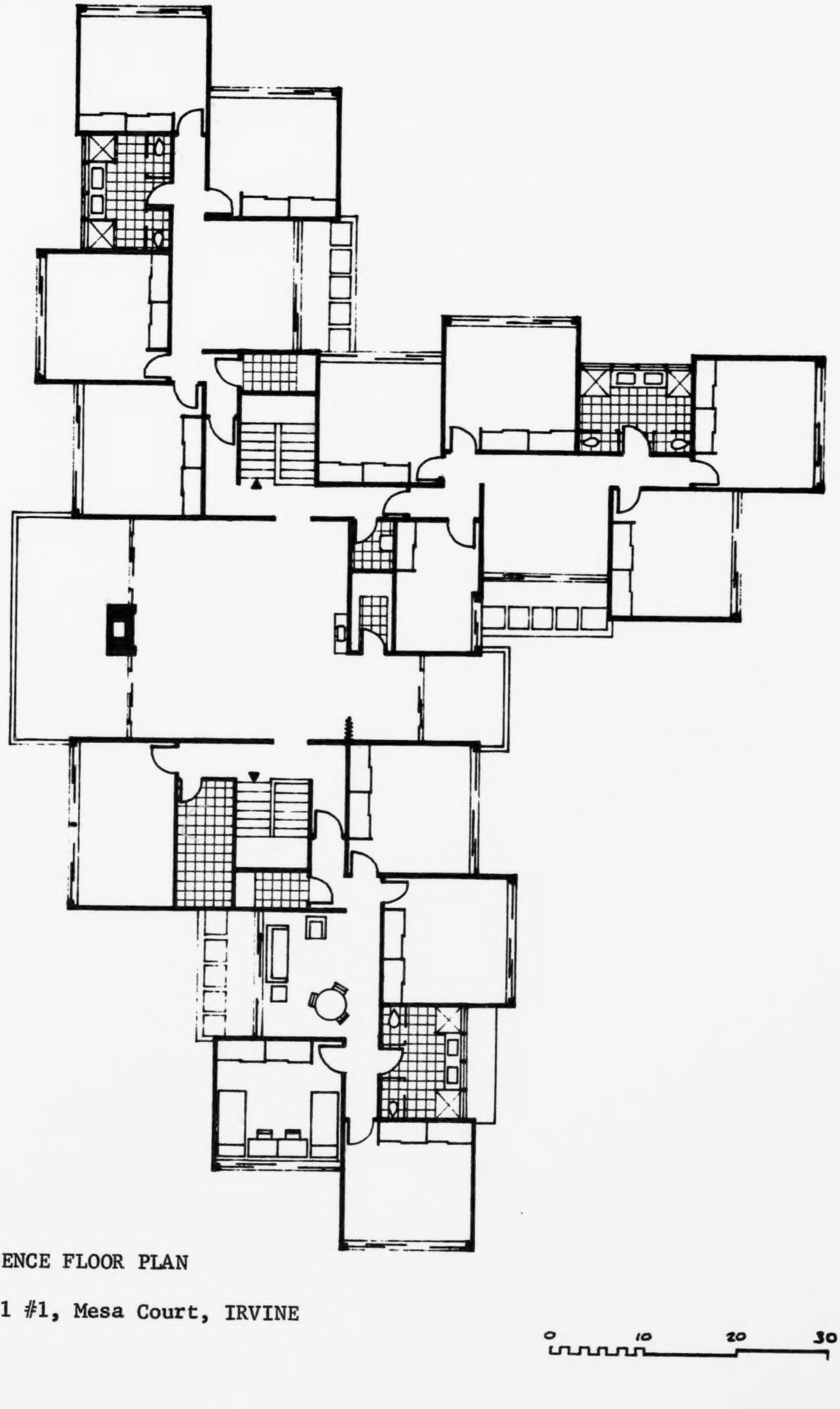
ASF per resident student = 142

Building Construction Cost (ENR = 988) = $1,336,227

Building Construction Cost per OGSF = $16.09

Building Construction Cost per resident student = $3,181

At time of bid, June, 1963, ENR = 899



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #1, Mesa Court, IRVINE

Residence Hall #1, Mesa Court, IRVINE

Mesa Court, for single students, consists of ten identical two-story buildings of UBC-Type V construction. Each building houses 51 students, using the vertical house plan configuration for suites of four double rooms, study lounge, and bath. A single room is provided in some suites for a resident assistant. Each floor has a central lounge-recreation room. The buildings are fully carpeted. Heating is provided by ceiling embedded electric radiant cables.

The complex was bid as eight buildings; two more being added later. The URBS analysis is based on the original eight buildings.

The complex was occupied in the fall, 1965.
The architect was Associated Architects (Wm. L. Periera & Associates, A. Quincy Jones, Frederick E. Emmons and Associates, Blurock-Ellerbroek & Associates).

DATA: Outside Gross Square Feet = 83,400

Assignable Square Feet = 51,950

Efficiency Ratio (ASF/OGSF) = .62

Resident Students = 408

OGSF per resident student = 204

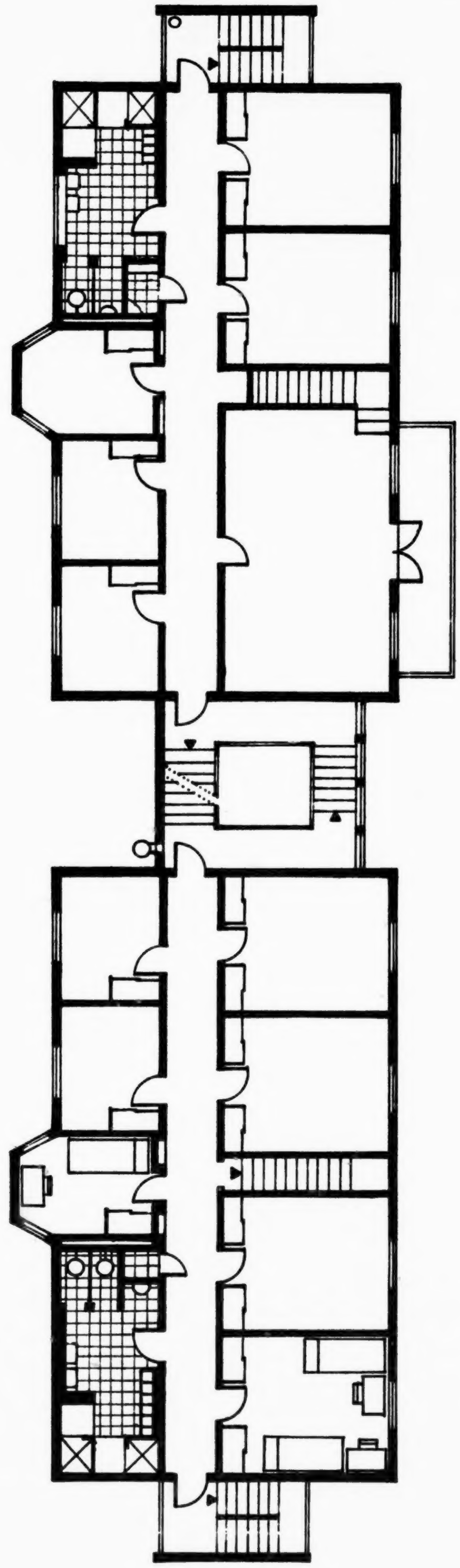
ASF per resident student = 127

Building Construction Cost (ENR = 988) = $1,408,449

Building Construction Cost per OGSF = $16.89

Building Construction Cost per resident student = $3,452

At time of bid, August 1964, ENR = 948.



TYPICAL RESIDENCE FLOOR PLAN

Residence College #1, Cowell College, SANTA CRUZ

### Residence College #1, Cowell College, SANTA CRUZ

This residence group, for single students, is composed of seven three-story buildings of UBC-Type III construction. Each building provides single and double rooms plus a few apartments, based on a double-loaded corridor plan. Each semi-gang bathroom provides for eleven students.

The buildings have cast-in-place concrete exterior walls and clay tile roofs. The floor system contains the hot water radiant heating embedded in thin concrete topping on wood construction.

The complex includes dining, kitchen and academic facilities which were omitted from the URBS analysis.

The residence halls opened for occupancy in September, 1966.
The architect was Public Structures, Inc. (Wurster, Bernardi and Emmons); San Francisco.

DATA: Outside Gross Square Feet = 89,500

Assignable Square Feet = 48,250

Efficiency Ratio (ASF/OGSF) = 0.54

Resident Students = 416

OGSF per resident student = 215

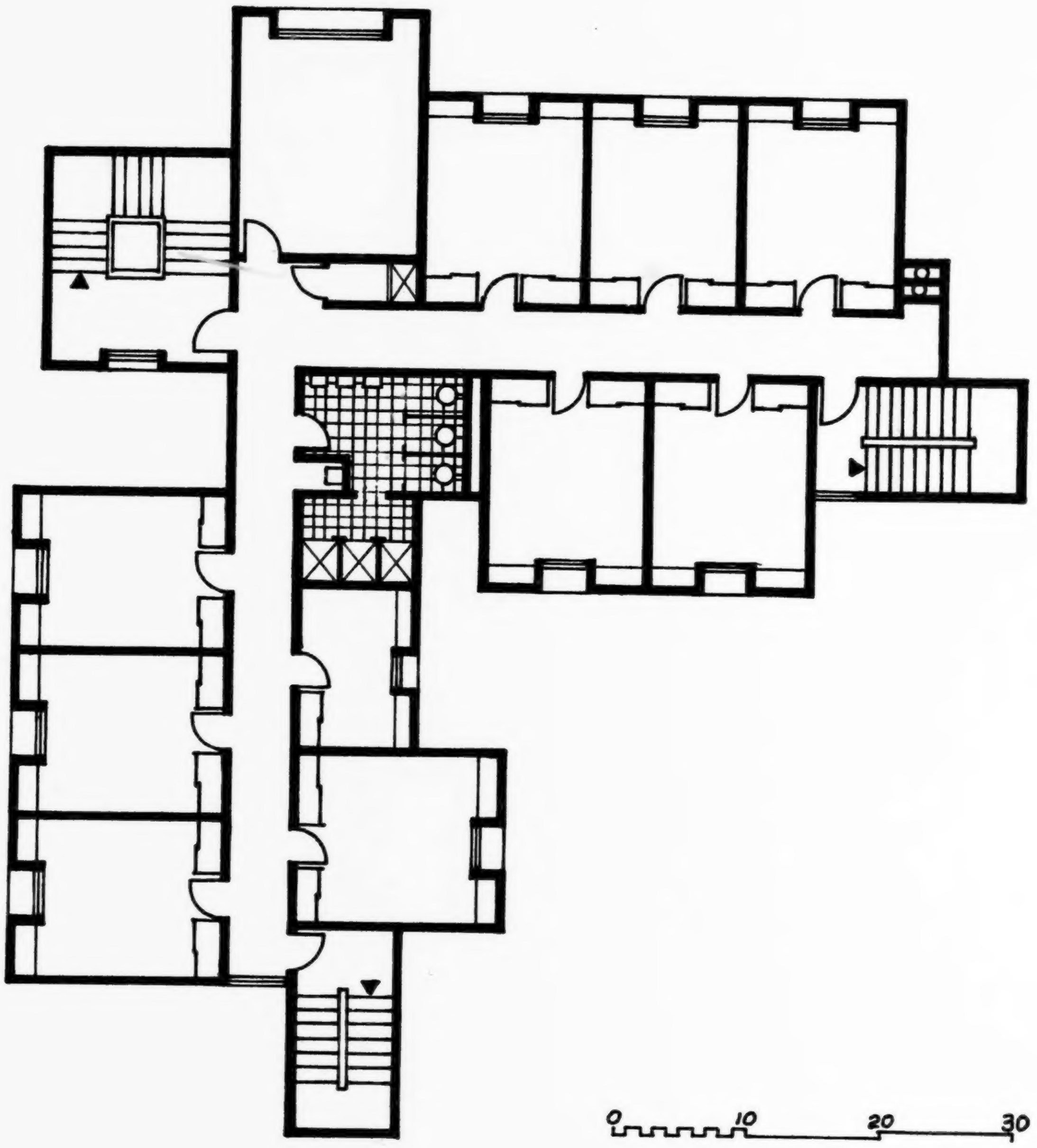
ASF per resident student = 116

Building Construction Cost (ENR = 988) = $1,680,756

Building Construction Cost per OGSF = $18.78

Building Construction Cost per resident student = $4,040

At time of bid, October, 1964, ENR = 948



TYPICAL RESIDENCE FLOOR PLAN

Residence College #3, Crown College, SANTA CRUZ

Residence College #3, Crown College, SANTA CRUZ

The housing for single students is a group of eight three-story buildings, of UBC-Type V construction. The distribution of single and double rooms on a double-loaded corridor, varies considerably from floor to floor thus creating a complicated exterior wall design. Each building contains an apartment for the Preceptor. Each floor provides a lounge and interior gang-bathroom serving sixteen students.

The buildings have exterior walls of stucco on wood frame, with resawn plywood extensively used as interior wall finish. Heating is by hot water convectors.

Crown College housing included the dining, kitchen and academic facilities in the bid. Only the housing was included in the URBS analysis.

The complex opened for occupancy in the fall, 1967.
The architect was Ernest J. Kump Associates, Palo Alto, California.

DATA: Outside Gross Square Feet = 85,940

Assignable Square Feet = 50,350

Efficiency Ratio (ASF/OGSF) = .59

Resident Students = 400

OGSF per resident student = 215

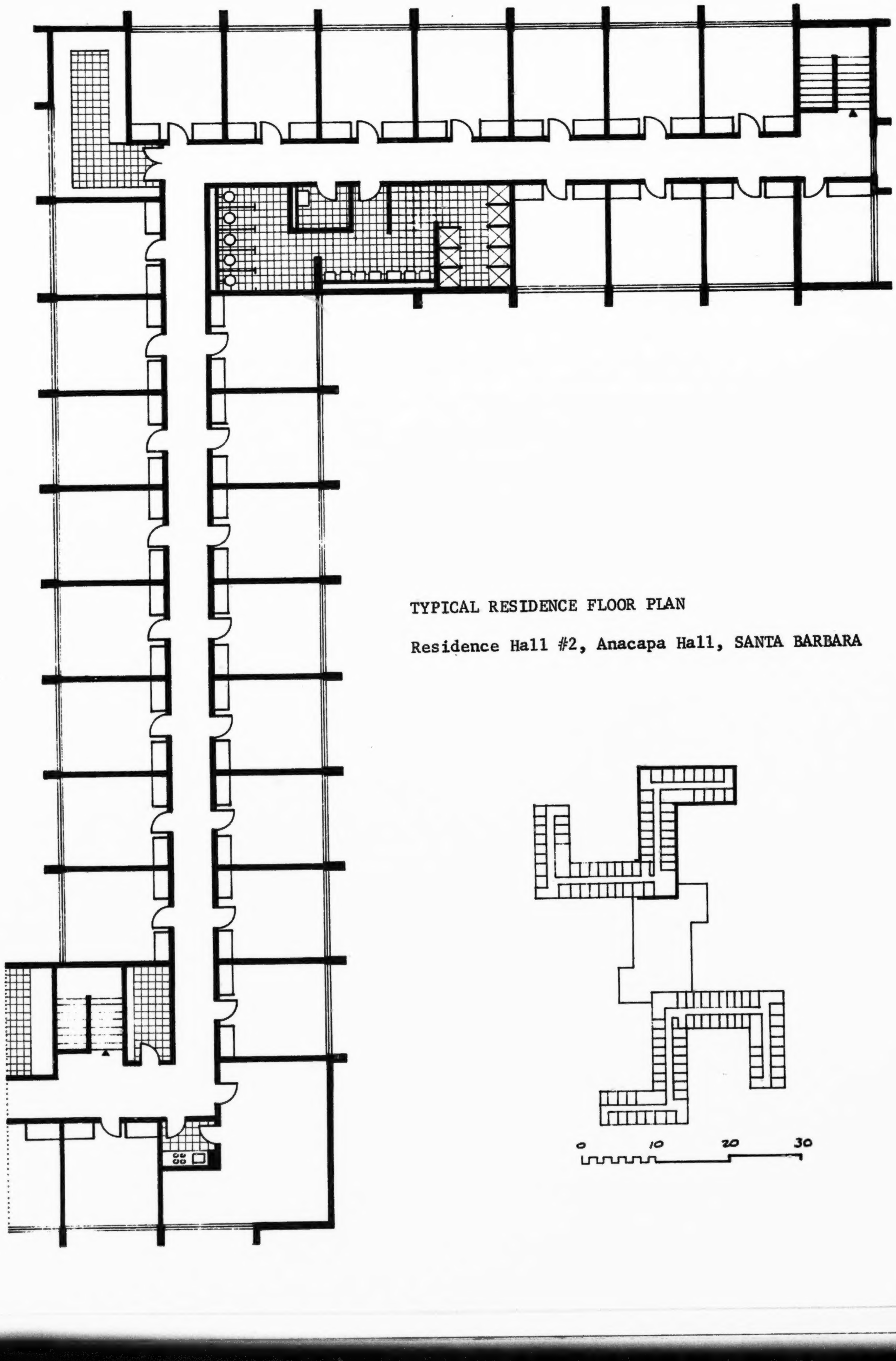
ASF per resident student = 126

Building Construction Cost (ENR = 988) = $1,603,153

Building Construction Cost per OGSF = $18.66

Building Construction Cost per resident student = $4,008

At time of bid, April 1966, ENR = 1007



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #2, Anacapa Hall, SANTA BARBARA

Residence Hall #2, Anacapa Hall, SANTA BARBARA

Anacapa Hall, and its twin Santa Cruz Hall, for single students, are two-story buildings of UBC-Type III construction. The buildings have concrete masonry bearing walls, concrete floors and roof slab, and wood stud interior partitions between the block walls. Heating is by hot water convectors.

Each building provides double rooms on a double-loaded corridor. Baths are interior gang-type each serving 51 students. A one-story wing contains a large lounge and recreation room.

The architect was Pereira and Luckman, Los Angeles.

DATA Outside Gross Square Feet = 75,000

Assignable Square Feet = 51,700

Efficiency Ratio (ASF/OGSF) = 0.69

Resident Students = 420

OGSF per resident student = 179

ASF per resident student = 123

Building Construction Cost (ENR=988) = $1,487,876

Building Construction Cost per OGSF = $19.83

Building Construction Cost per resident student = $3,542

At time of bid, March, 1958, ENR = 744.

BUILDING COSTS -- URBS COMPONENT EQUIVALENTS
(Dollar Cost per Outside Gross Square Feet)

| UBC TYPE | PROJECT AND LOCATION | COST OF ELEMENTS EQUIVALENT TO URBS COMPONENTS AND PERCENT OF TOTAL | | | | | | REMAINING NON-COMPONENT BUILDING COST INCLUDING OVERHEAD AND PROFIT | TOTAL BUILDING COST |
|---|---|---|---|---|---|---|---|---|---|
| | | STRUCTURE CEILING | PARTI-TIONS | HVC | BATH-ROOMS | FUR-NISH-INGS | TOTAL OF COMPONENTS | | |
| I | Priestly Hall, BERKELEY | $6.88<br>31% | ($2.32)<br>11% | $1.28<br>6% | $1.63<br>8% | $0.75<br>3% | $12.86<br>59% | $9.08<br>41% | $21.94 |
| | Ryerson Hall, DAVIS | $5.00<br>23% | $2.73<br>13% | $2.12<br>10% | ($1.49)<br>7% | $0.64<br>3% | ($11.98)<br>55% | $9.67<br>45% | ($21.65) |
| | Hedrick Hall, LOS ANGELES | $4.27<br>21% | $3.12<br>15% | ($1.77)<br>8% | $0.97<br>5% | $1.42<br>7% | $11.55<br>55% | ($9.49)<br>45% | $21.04 |
| | Lothian Hall, RIVERSIDE | $5.03<br>23% | $1.90<br>9% | $3.81<br>17% | $1.77<br>8% | ($0.67)<br>1% | $13.18<br>59% | $8.88<br>41% | $22.06 |
| | Revelle Hall, SAN DIEGO | ($5.02)<br>26% | $1.34<br>7% | $1.50<br>8% | $1.14<br>6% | $1.70<br>8% | $10.70<br>51% | $10.24<br>49% | $20.94 |
| | Average: | $5.24<br>24% | $2.28<br>11% | $2.09<br>10% | $1.40<br>7% | $1.03<br>5% | $12.06<br>57% | $9.47<br>43% | $21.53<br>100% |
| III - V | Regan Hall, DAVIS | $2.21<br>14% | $1.68<br>10% | $2.60<br>16% | $1.08<br>7% | $0.63<br>4% | ($8.20)<br>51% | $7.89<br>49% | $16.09 |
| | Mesa Court, IRVINE | $2.39<br>14% | $1.64<br>10% | $1.18<br>7% | ($1.19)<br>7% | ($0.58)<br>3% | $6.94<br>41% | ($9.95)<br>59% | $16.89 |
| | Cowell College, SANTA CRUZ | $4.13<br>23% | $1.64<br>9% | ($1.67)<br>9% | $1.37<br>8% | $0.45<br>3% | $9.26<br>52% | $8.47<br>48% | ($17.73) |
| | Crown College, SANTA CRUZ | ($2.68)<br>15% | $2.11<br>12% | $0.97<br>5% | $1.35<br>7% | $0.57<br>3% | $7.68<br>42% | $10.62<br>58% | $18.30 |
| | Anacapa Hall, SANTA BARBARA | $3.93<br>20% | ($1.70)<br>9% | $1.81<br>9% | $1.05<br>5% | $0.96<br>5% | $9.45<br>48% | $10.38<br>52% | $19.83 |
| | Average: | $3.06<br>18% | $1.75<br>10% | $1.65<br>9% | $1.20<br>7% | $0.64<br>4% | $8.30<br>47% | $9.46<br>53% | $17.76<br>100% |

( ) = Median

## BUILDING COSTS AND COMPONENT EQUIVALENT COSTS

The adjacent table summarizes the cost analysis work on the ten different projects. The costs are shown for those elements of the building equivalent to each of the five URBS components, together with their percentage of the total. This summary is derived from the diagrams on the following pages. These diagrams isolate all elements comparable to a URBS component, permitting detailed cost analysis.

The element costs in the diagrams stated in "cost per square foot of component" have been transposed to "cost per O.G.S.F." in the preceding table on page 28.

The Type I buildings show remarkably similar overall costs. The varying characteristics of the buildings are reflected within the distribution of the URBS component equivalents. Note the conspicuous variations in the distribution. The Structure-Ceiling component cost for Priestly Hall reflects the elaborate concrete structure plus the extensive suspended ceiling. The HVC component cost for Lothian Hall is high as it is the only fully air-conditioned building in the group. The Bathroom component costs vary with the amount of ceramic tile and terrazzo used. The Furnishings component cost for all of the buildings reflects the amount of such work included in the General Contractor's contract. Each building supplied wardrobes in the student rooms. In addition, Hedrick Hall and Revelle Hall provided built-in desks and beds. Thus, these two projects reflect a higher cost for the Furnishings component.

The Type III and V buildings are more varied in both total building cost and within the distribution of the URBS component equivalents. The distribution of the latter is less in percentage for this group of buildings. This is because ground floor, foundation, and exterior wall areas are proportionately greater in low-rise buildings than in the high-rise buildings predominant in the Type I group. Note that none of these items involve URBS components.

The URBS Structure-Ceiling component excludes the exterior walls but does include exterior shear walls. A portion of the exterior walls for the ten projects has been included in the diagrams and the comparative table as equivalent cost. This has resulted in the two Type III buildings (Cowell College and Anacapa Hall) recording higher structural costs than for the Type V buildings. Three of the projects--Mesa Court, Crown College and Anacapa Hall--show a lower percentage of URBS component equivalent cost than the other projects. This is caused by the irregularly shaped plan each of the three has, for each has a larger proportion of exterior wall to interior partitions. Determination of the equivalent cost of the partitions for this group of three projects considered wood stud partitions within the URBS equivalent component, even though they were load-bearing in some cases. This determination was made because such partitions were constructed in the same way as non-load-bearing walls.

The HVC component shows Regan Hall having the highest cost in the Type III-V group. Regan Hall provides cooling and heating, but does not supply air (Ryerson Hall is similar).

The cost estimates for furnishings in this analysis included only those elements provided under the General Construction Contract. The URBS Furnishings component requires a larger range of storage units, desks, chairs, beds, light fixtures, shelving and accessories.

The diagrams and tabulations on the following pages illustrate and compile the estimates in component groups, relating the estimated costs to the quantities of each component. The "URBS Component Equivalent" listed is that portion of the component which would be replaced by a URBS component in a URBS Housing Project building. The abbreviation, "N.S." means "non-system." The Equivalent and Non-System components total to make the Sub-cost, which represents the estimated sub-contract price per square foot of component. At the end of each tabulation is the sub-contract price with overhead and profit added.

The "C-Ratio," where noted is the proportionate relationship of the area of the component to the overall gross square feet of the project; otherwise areas are outside gross square feet (O.G.S.F.).

## BELOW GRADE & GROUND FLOOR COMPONENT COSTS (TYPE I BUILDINGS)

| | CONSTRUCTION COST | | | URBS COMPONENT EQUIVALENT per O.G.S.F. |
|---|---|---|---|---|
| | Per sq. ft. of component | Per Resident | Per O.G.S.F. | Bathrooms |
| Priestly Hall<br>BERKELEY | $8.74 | $182 | $0.97 | $0.03<br>3% |
| Ryerson Hall<br>DAVIS | ($9.96) | $430 | $2.00 | $0.01<br>0.5% |
| Hedrick Hall<br>LOS ANGELES | $10.16 | $267 | $1.35 | -0- |
| Lothian Hall<br>RIVERSIDE | $6.91 | ($285) | ($1.73) | $0.10<br>5% |
| Revelle Hall<br>SAN DIEGO | $10.95* | $573* | $3.08* | $0.08<br>3% |

* High ( ) Median ______ Low

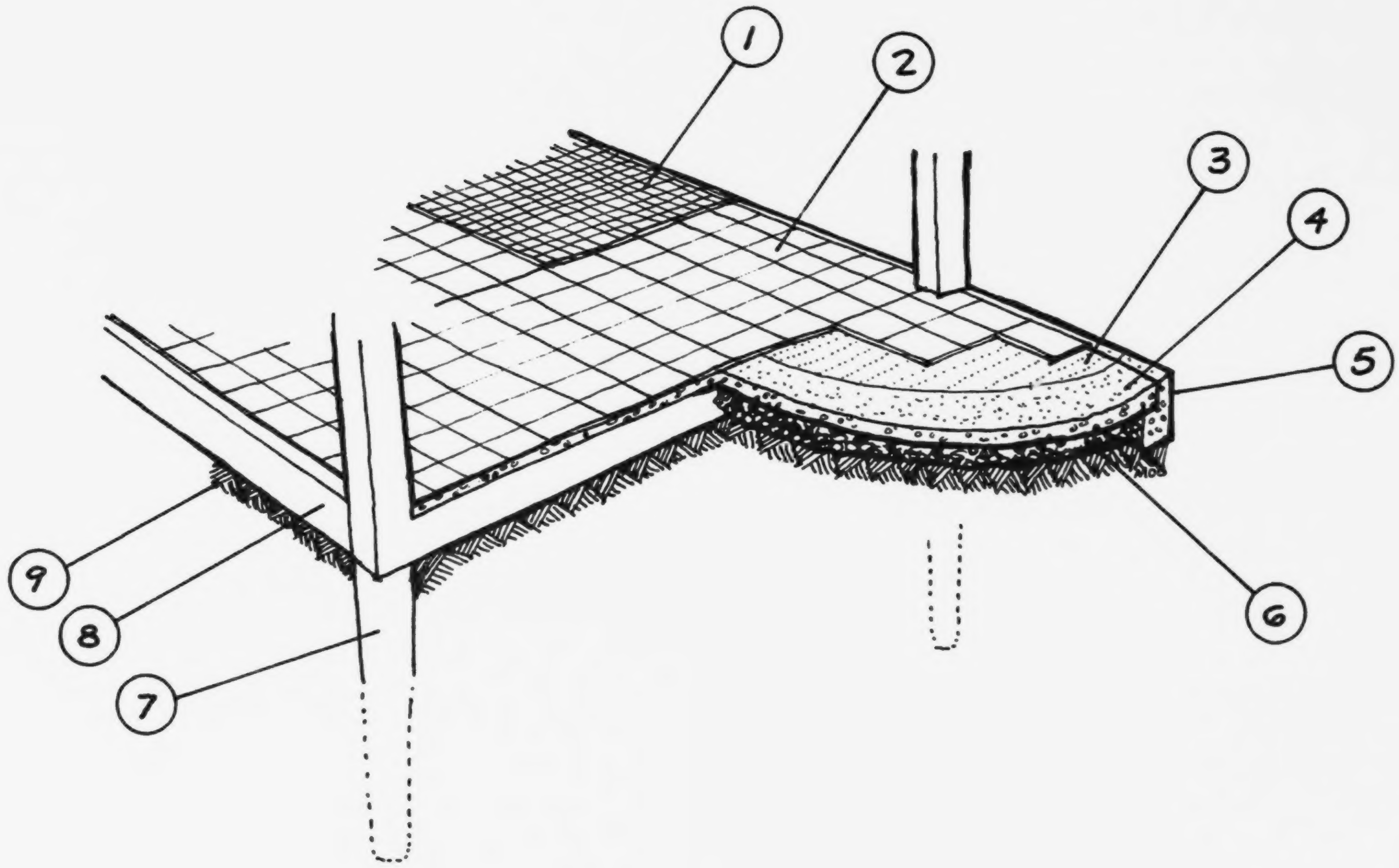
Below grade and ground floor costs reflect the complexity of foundations and the height of the building.

Lothian Hall has the lowest cost per square foot of component because of its simple column arrangement; it has the median costs per resident and per O.G.S.F. because it is only four floors high. Priestly Hall has the lowest cost per resident and per O.G.S.F. because it is nine floors high, spreading the cost of the foundations and ground floor over a proportionately large building area. Revelle Hall is high in cost because if its low height. Hedrick Hall was estimated without the dining facilities on its ground floor, thus it has a proportionally small ground floor area. Its second highest cost per square foot of component results from this artificially small area combined with many expensive column footings; its second lowest cost per resident and per O.G.S.F. results from this artificially small area relative to the large combined area of the other six floors above the ground floor.

The bathroom floor is the only URBS component equivalent in this tabulation, as foundations and construction at grade are not included in the University Residential Building System.

Custodial care is heavy for finishes which must be cleaned or waxed often, such as in bathrooms. Custodial care is light for finishes which require only occasional sweeping, such as concrete floor surfaces.

Maintenance is heavy for finishes such as paint, carpet, and vinyl tile which wear out and are replaced within twenty years. Maintenance is light for items which require occasional repair, such as terrazzo flooring.

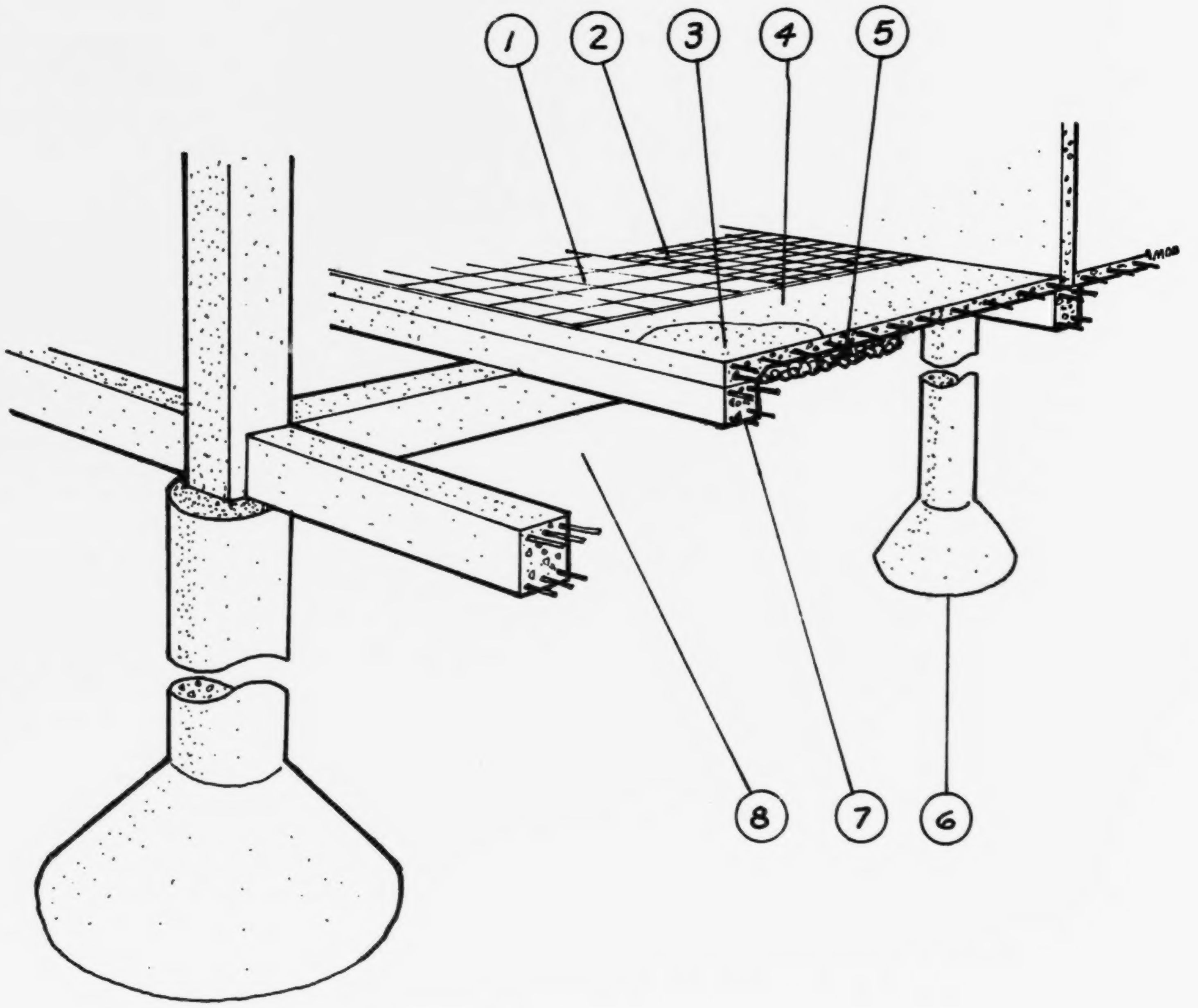


BELOW GRADE AND GROUND FLOOR 4,450 sq. ft. = $ 33,690
C- Ratio (Component in Square Feet/OGSF = 0.11

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Ceramic Tile | 0.31 | | 0.31 | H | |
| 2. Vinyl Tile | | 0.45 | 0.45 | H | H |
| 3. Finish Concrete Floor | | 0.01 | 0.01 | L | |
| 4. Concrete Slab | | 1.00 | 1.00 | | |
| 5. Curb | | 0.11 | 0.11 | | |
| 6. Gravel Base | | 0.09 | 0.09 | | |
| 7. Poured Concrete Caissons | | 4.49 | 4.49 | | |
| 8. Concrete Grade Beams | | 0.59 | 0.59 | | |
| 9. Excavation | | 0.51 | 0.51 | | |
| | 0.31 | 7.25 | 7.56 | | |

Installed Cost Including Overhead & Profit $38,912 @ $8.74/square foot

RESIDENCE HALL NO. 3 PRIESTLY, BERKELEY

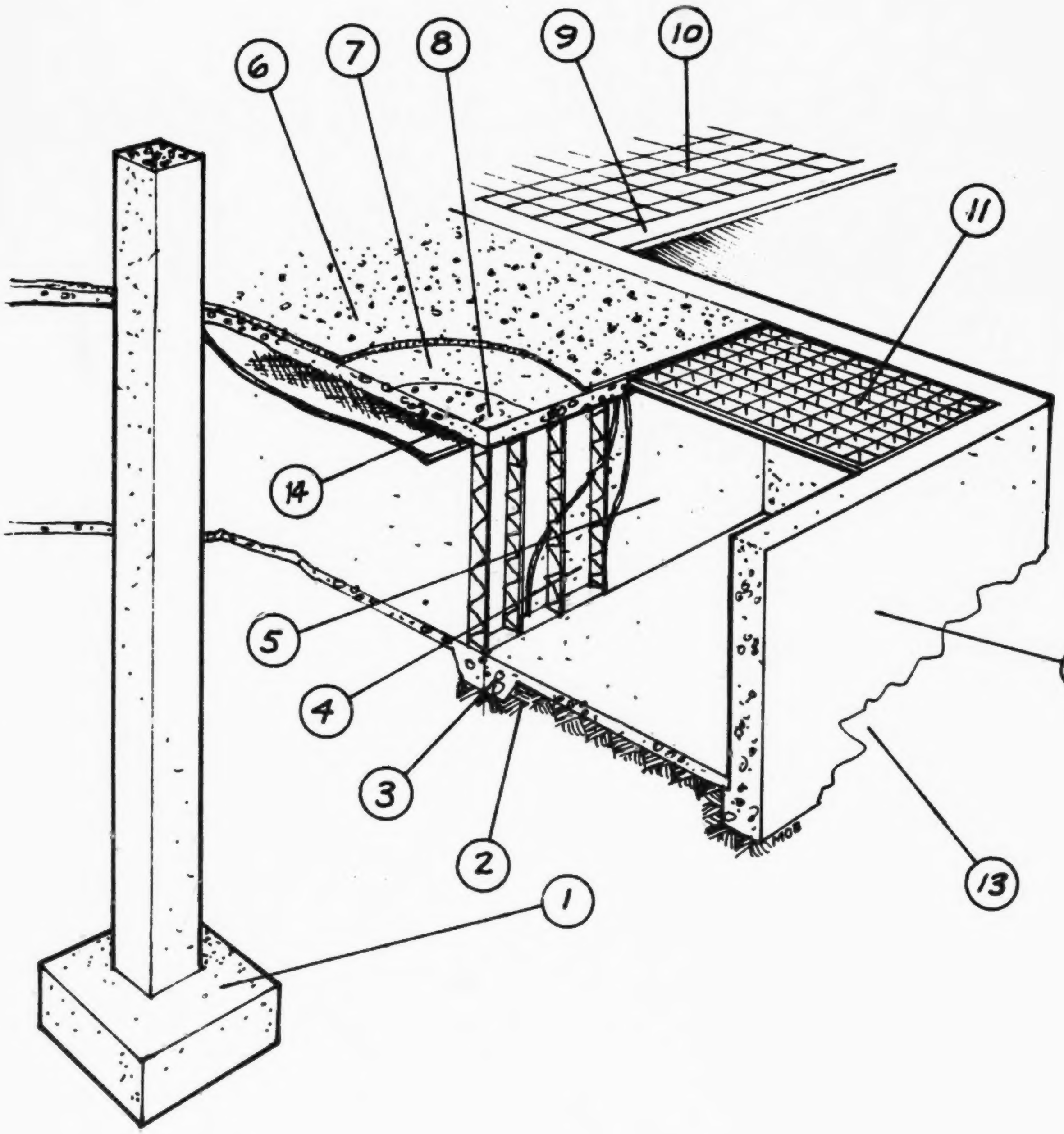


**BELOW GRADE AND GROUND FLOOR** 8,800 square feet = $75,950
C - Ratio (Component in Square Feet/OGSF) = 0.20

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Vinyl Asbestos Flooring | | 0.20 | 0.20 | H | H |
| 2. Ceramic Tile Flooring | 0.06 | | 0.06 | H | |
| 3. Concrete Slab | | 1.11 | 1.11 | | |
| 4. Color Finish | | 0.05 | 0.05 | L | |
| 5. Gravel Base | | 0.11 | 0.11 | | |
| 6. Caissons | | 2.27 | 2.27 | | |
| 7. Grade Beams | | 4.54 | 4.54 | | |
| 8. Building Excavation | | 0.29 | 0.29 | | |
| | 0.06 | 8.57 | 8.63 | | |

Installed Cost Including Overhead & Profit $87,720 @ $9.97/square foot

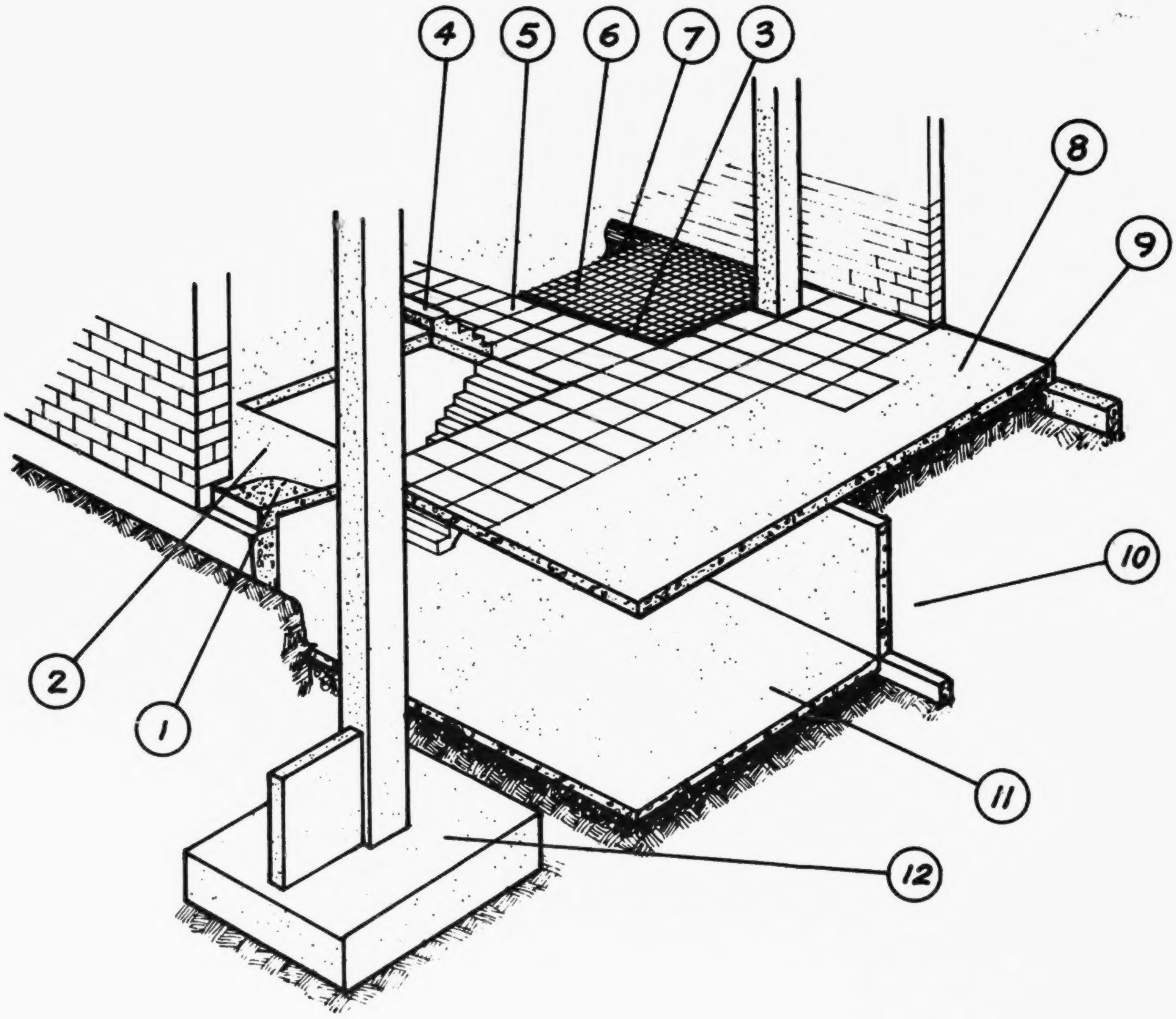
RESIDENCE HALL NO. 5, RYERSON, DAVIS



BELOW GRADE AND GROUND FLOOR 21,990 square feet = $193, 370
C - Ratio (Component in Square Feet/OGSF) = 0.13

| | URBS COMPONENT EQUIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | Non-System | | Cost | Maint. |
| 1. Column Footings, Incl. Excavation | 4.95 | 4.95 | | |
| 2. Trenching | 0.05 | 0.05 | | |
| 3. Wall Footings and Grade Beams | 0.39 | 0.39 | | |
| 4. Partitions | 0.10 | 0.10 | | |
| 5. Paint | 0.08 | 0.08 | L | H |
| 6. Terrazzo Flooring | 0.29 | 0.29 | L | L |
| 7. Concrete Finish | 0.13 | 0.13 | | |
| 8. Concrete Slab over Basement | 0.52 | 0.52 | | |
| 9. Concrete Slab on Grade | 0.81 | 0.81 | | |
| 10. Vinyl Tile Flooring | 0.37 | 0.37 | H | H |
| 11. Metal Grating and Louvers | 0.10 | 0.10 | | |
| 12. Concrete Walls | 0.69 | 0.69 | | |
| 13. Excavation and Back fill | 0.27 | 0.27 | | |
| 14. Lath and Plaster Ceiling | 0.01 | 0.01 | | |
| 15. Concrete Stairs (not shown) | 0.03 | 0.03 | L | |
| | 8.79 | 8.79 | | |

Installed Cost Including Overhead & Profit $223,340 @10.15 /square foot
RESIDENCE HALL NO. 4, HEDRICK, LOS ANGELES

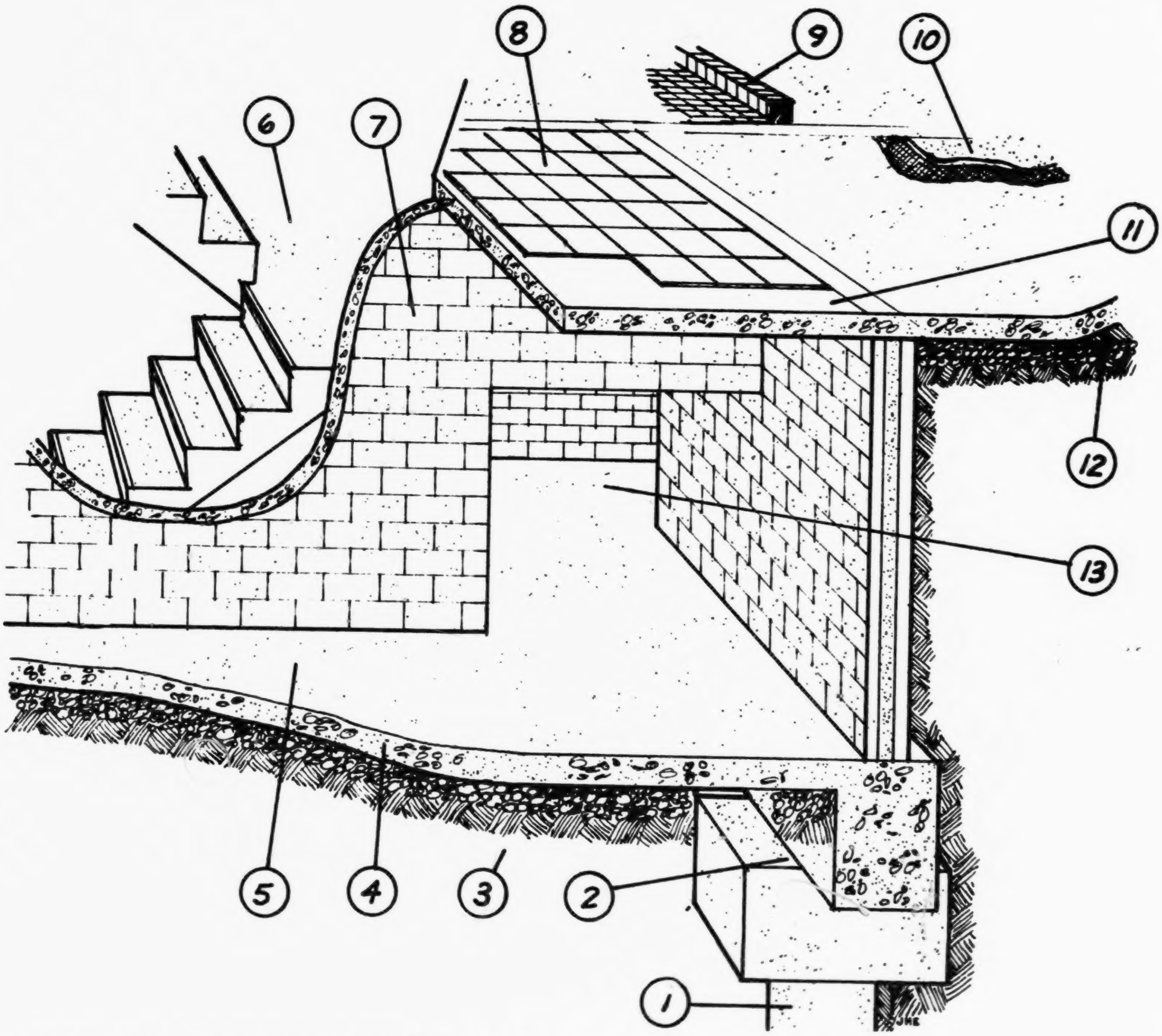


BELOW GRADE AND GROUND FLOOR 17,400 square feet = $104,140
C - Ratio (Component in Square Feet/OGSF) = 0.25

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Concrete Slab over Basement | | 0.29 | 0.29 | | |
| 2. Finish Structural Concrete | | 0.05 | 0.05 | | |
| 3. Concrete Curb | 0.01 | | 0.01 | | |
| 4. Concrete Stairs | | 0.13 | 0.13 | L | |
| 5. Asphalt Tile Floor | | 0.24 | 0.24 | H | H |
| 6. Ceramic Tile Floor and Base | 0.34 | | 0.34 | H | |
| 7. Waterproof Membrane | 0.05 | | 0.05 | | |
| 8. Slab on Compacted Fill | | 0.86 | 0.86 | | |
| 9. Form and Compact Fill | | 0.09 | 0.09 | | |
| 10. Building Excavation | | 0.63 | 0.63 | | |
| 11. Finish Basement Slab | | 0.03 | 0.03 | L | |
| 12. Foundation and Grade Beams | | 3.26 | 3.26 | | |
| | 0.40 | 5.58 | 5.98 | | |

Installed Cost Including Overhead & Profit $120,280 @ $6.91/square foot

RESIDENCE HALL NO. 4, LOTHIAN, RIVERSIDE

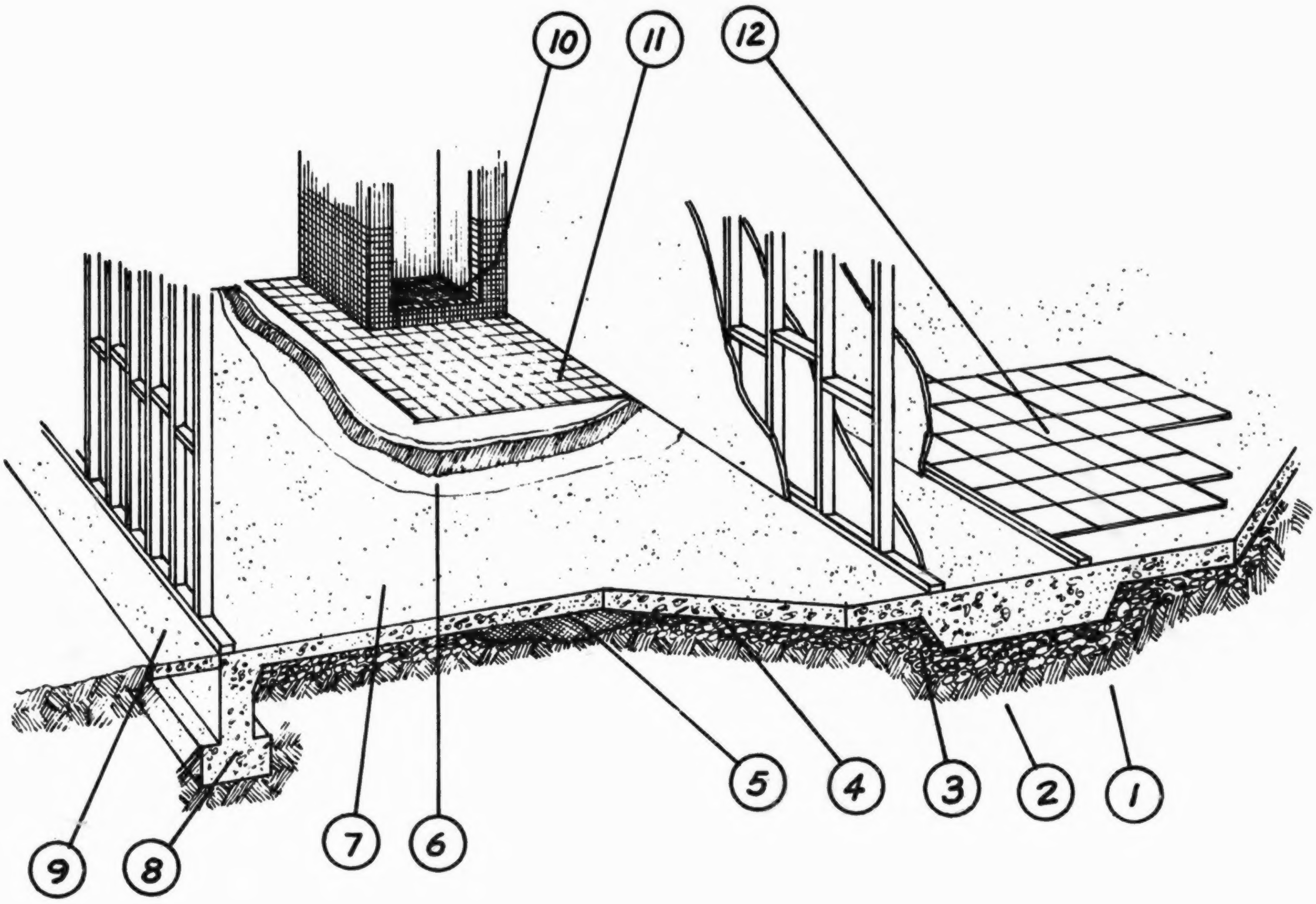


BELOW GRADE AND GROUND FLOOR 23,340 square feet = $219,270
C - Ratio (Component in Square Feet/OGSF) =0.28

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Caissons and Drilling | | 1.57 | 1.57 | | |
| 2. Concrete Grade Beams and Caps | | 2.50 | 2.50 | | |
| 3. Excavation | | 0.72 | 0.72 | | |
| 4. Slab on Grade | | 1.00 | 1.00 | | |
| 5. Finish Concrete | | 0.22 | 0.22 | | |
| 6. Concrete Stairs | | 0.22 | 0.22 | L | |
| 7. Concrete Block Wall | | 1.16 | 1.16 | | |
| 8. Vinyl Asbestos Tile | | 0.04 | 0.04 | H | H |
| 9. Terrazzo Flooring and Curb | 0.02 | | 0.02 | H | L |
| 10. Carpet and Pad | | 0.88 | 0.88 | H | H |
| 11. Concrete Floor Slab | | 0.39 | 0.39 | | |
| 12. Waterproof Membrane | 0.25 | | 0.25 | | |
| 13. Concrete Utility Tunnels | | 0.41 | 0.41 | | |
| 14. Concrete Retaining Wall (not shown) | | 0.02 | 0.02 | | |
| | 0.27 | 9.13 | 9.40 | | |

Installed Cost Including Overhead & Profit $253,259 @ $10.85/square foot

RESIDENCE HALL NO. 1, REVELLE, SAN DIEGO



BELOW GRADE AND GROUND FLOOR 39,770 square feet = $138,165
C - Ratio (Component in Square Feet/OGSF) = 0.48

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Excavation and Fill | | 0.03 | 0.03 | | |
| 2. Trenching | | 0.17 | 0.17 | | |
| 3. Gravel | | 0.03 | 0.03 | | |
| 4. Concrete Slab | | 0.87 | 0.87 | | |
| 5. Dampproofing | | 0.26 | 0.26 | | |
| 6. Finish Concrete for Tile | | 0.10 | 0.10 | | |
| 7. Finish Exposed Concrete | | 0.04 | 0.04 | | |
| 8. Footings | | 0.67 | 0.67 | | |
| 9. Concrete Mowing Strip | | 0.13 | 0.13 | | |
| 10. Terrazzo at Showers | 0.03 | | 0.03 | H | |
| 11. Ceramic Tile | 0.17 | | 0.17 | H | |
| 12. Vinyl Asbestos Tile | | 0.27 | 0.27 | H | H |
| 13. Mechanical Building (not shown) | | 0.70 | 0.70 | L | L |
| | 0.20 | 3.27 | 3.47 | | |

Installed Cost Including Overhead & Profit $159,370 @ $4.01/square foot

RESIDENCE HALL NO. 6, REGAN, DAVIS

## BELOW GRADE & GROUND FLOOR COMPONENT COSTS (TYPE III - V BUILDINGS)

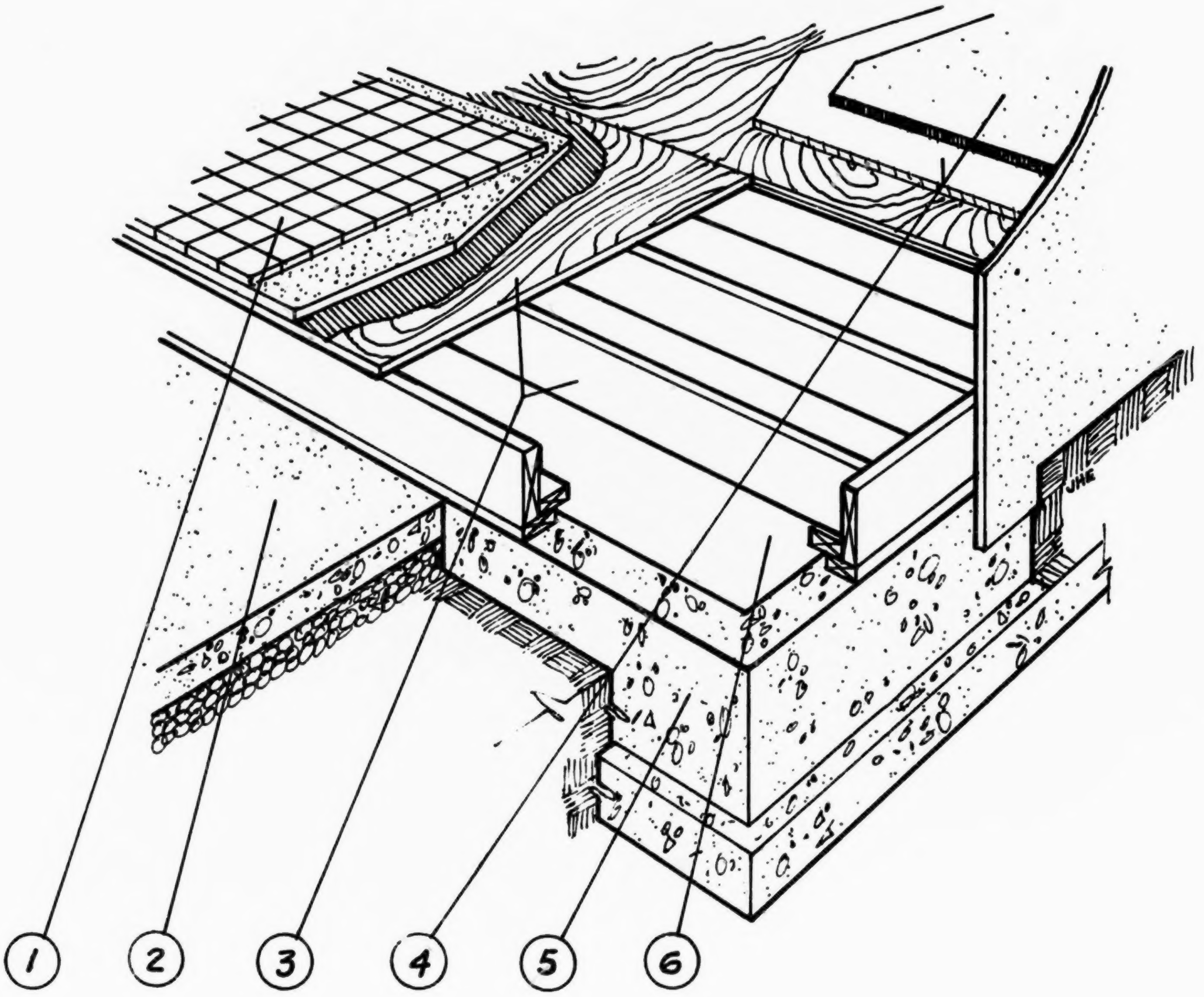
|  | CONSTRUCTION COST |  |  | URBS COMPONENT EQUIVALENT per O.G.S.F. |
|---|---|---|---|---|
|  | Per sq. ft. of component | Per Resident | Per OGSF | Bathroom |
| Regan Hall<br>DAVIS | $4.01 | $379 | $1.92 | $0.10<br>5% |
| Mesa Court<br>IRVINE | $4.66 | ($514) | ($2.51) | $0.07<br>3% |
| Cowell College<br>SANTA CRUZ | ($4.89) | $306 | $1.34 | $0.04<br>3% |
| Crown College<br>SANTA CRUZ | $8.12* | $528 | $2.41 | $0.02<br>1% |
| Anacapa Hall<br>SANTA BARBARA | $5.46 | $597* | $3.34* | $0.09<br>3% |

* High ( ) Median _____ Low

Crown College is highest in below grade and ground floor cost per square foot of component because of its sloping site and consequent large amount of concrete wall around unused crawl space below the ground floor. Anacapa Hall is highest in cost per resident and per O.G.S.F. because it is only a two-story building, and the complexity of its foundations results from extensive use of bearing walls for interior partitions. Though Mesa Court is also a two-story building, it is median in below grade and ground floor cost because of its light wood frame construction and lack of a basement. Cowell College is lowest in cost per resident and per O.G.S.F. because it consists of three-and-four-story buildings with very simple foundation layouts, and its split-level planning better adjusts it to its sloping site. Regan Hall is lowest in cost per square foot of component because of its simple layout, light wood-frame construction, and flat site. Note that the below grade and ground floor cost of Priestly Hall, a nine-story Type I building is substantially lower per resident and per O.G.S.F. than is any of the Type III-V buildings, despite the fact that Priestly has elaborate caissons to carry its great weight. Although a portion of the residential area occurs on the ground floor of low-rise buildings, diluting here the measure of foundations alone, apparently high-rise buildings make more efficient use of their foundation cost than can low-rise buildings despite the more expensive types of footing required. High-rise construction at grade is typically more expensive per square foot of component than is low rise, and is less expensive per resident and per O.G.S.F.

Bathroom floors are the only items in this tabulation that are equivalent to URBS components.

Custodial and Maintenance considerations for Type I buildings apply equally to Type III-V buildings.

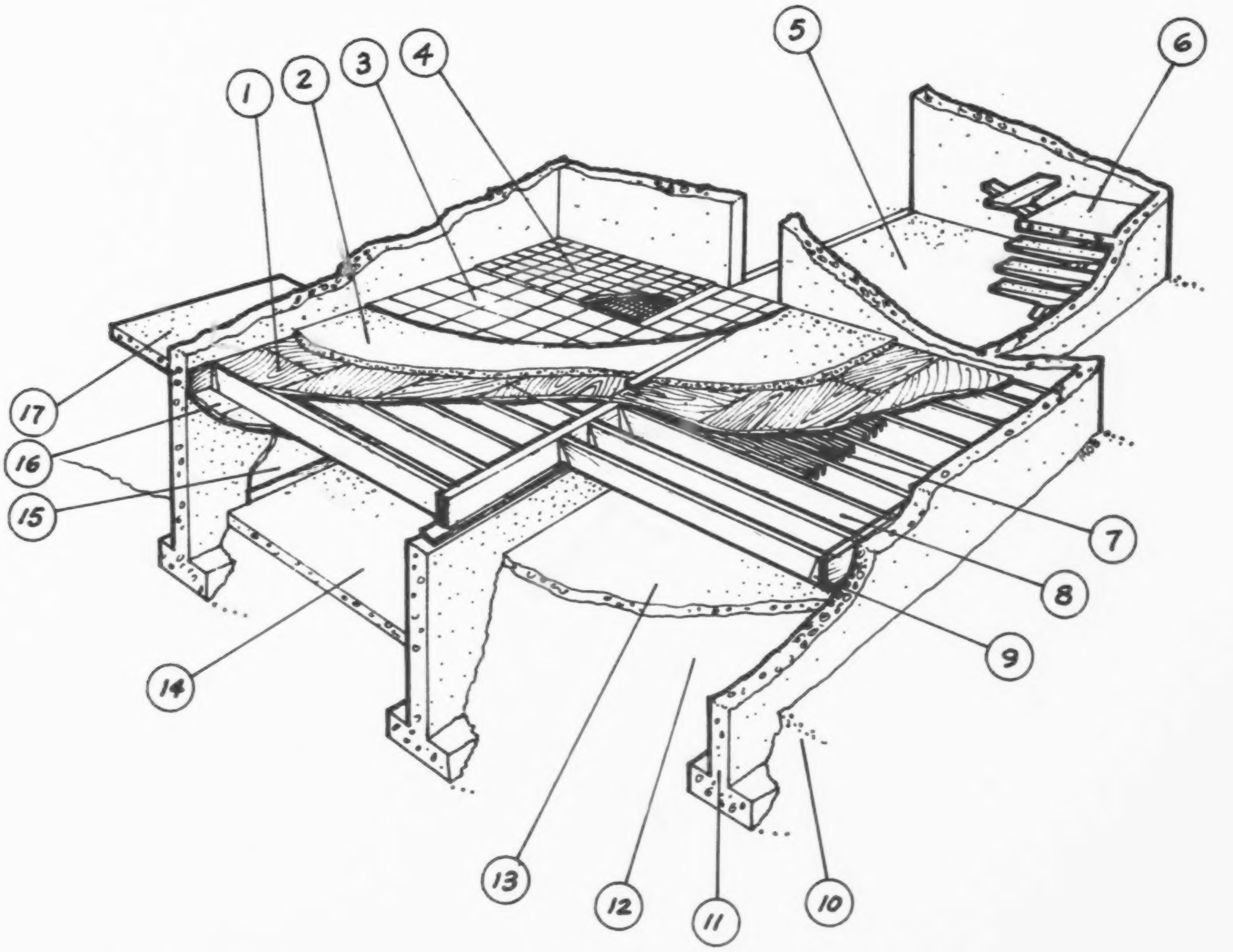


BELOW GRADE AND GROUND FLOOR 45,000 square feet = $181,890
C - Ratio (Component in Square Feet/OGSF) = 0.54

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Ceramic Tile | 0.13 | | 0.13 | H | |
| 2. Concrete Grade Slabs | | 0.20 | 0.20 | | |
| 3. Wood Framing | | 0.77 | 0.77 | | |
| 4. Carpet and Pad | | 1.04 | 1.04 | H | H |
| 5. Foundations | | 1.51 | 1.51 | | |
| 6. Grading | | 0.38 | 0.38 | | |
| 7. Concrete Stairs (not shown) | 0.13 | 3.91 | 4.04 | | |

Installed Cost Including Overhead & Profit $209,713 @ $4.66/square foot

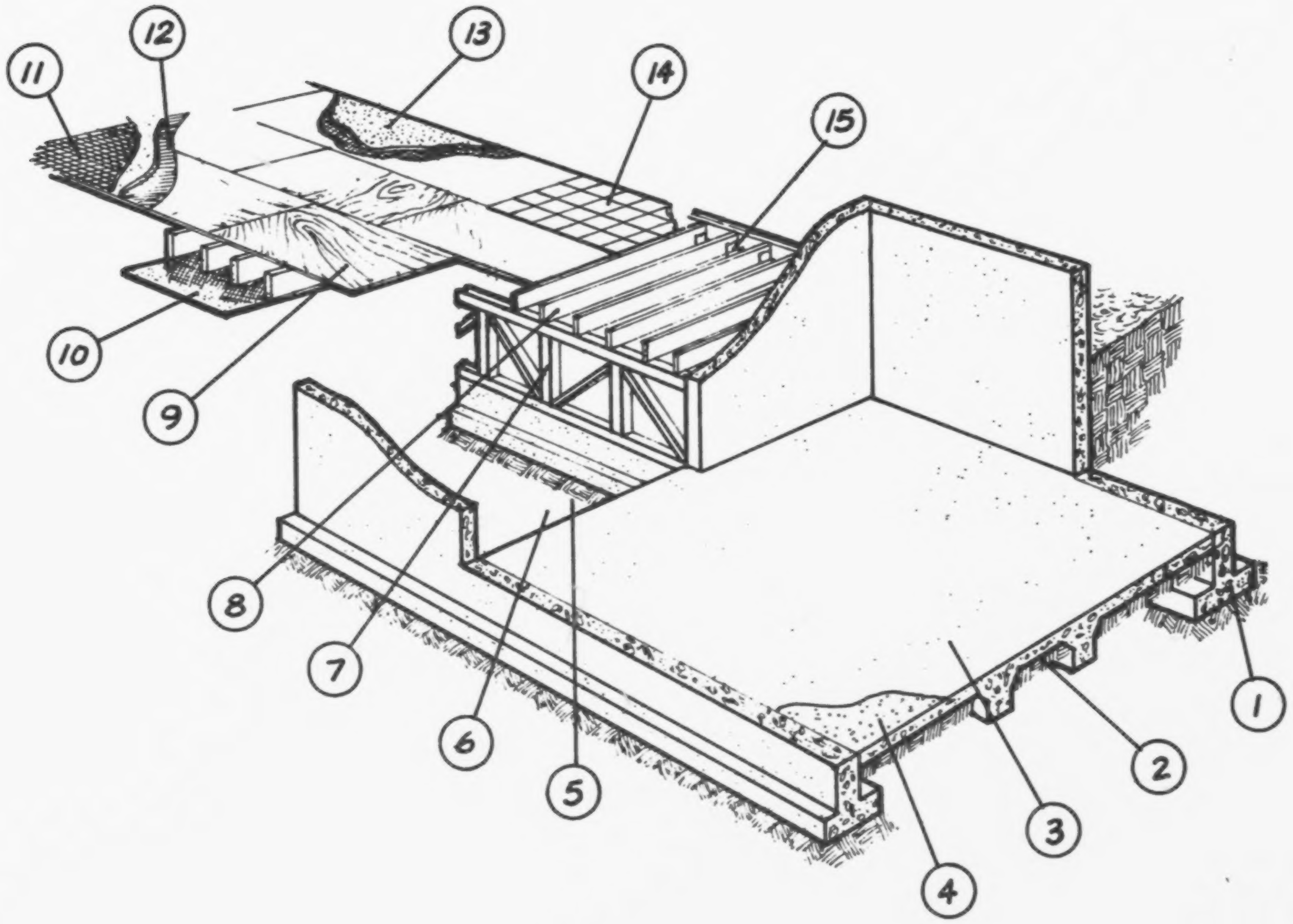
RESIDENCE HALL NO. 1, MESA COURT, IRVINE



BELOW GRADE AND GROUND FLOOR 26,050 square feet = $110,390
C - Ratio (Component in Square Feet/OGSF) = 0.28

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Plywood Sheathing | | 0.24 | 0.24 | | |
| 2. Concrete Floor Fill | | 0.12 | 0.12 | | |
| 3. Vinyl-Abestos Tile | | 0.26 | 0.26 | H | H |
| 4. Ceramic Tile w/waterproofing | 0.16 | | 0.16 | H | |
| 5. Concrete Slab | | 0.12 | 0.12 | | |
| 6. Precast stairs | | 0.44 | 0.44 | L | |
| 7. Batt Insulation | | 0.17 | 0.17 | | |
| 8. Wood Framing | | 0.33 | 0.33 | | |
| 9. Joist Hangers | | 0.04 | 0.04 | | |
| 10. Grading | | 0.03 | 0.03 | | |
| 11. Foundations | | 1.53 | 1.53 | | |
| 12. Excavation | | 0.30 | 0.30 | | |
| 13. Ratproofing Slab | | 0.09 | 0.09 | | |
| 14. Basement Slab | | 0.12 | 0.12 | L | |
| 15. Finish Basement Room incl.Paint | | 0.19 | 0.19 | L | L |
| 16. Gypsum Board Ceiling incl.Paint | | 0.03 | 0.03 | L | L |
| 17. Concrete Balcony | | 0.07 | 0.07 | L | |
| | 0.16 | 4.05 | 4.21 | | |

Installed Cost Including Overhead & Profit $127,500 @ $4.89/square foot.

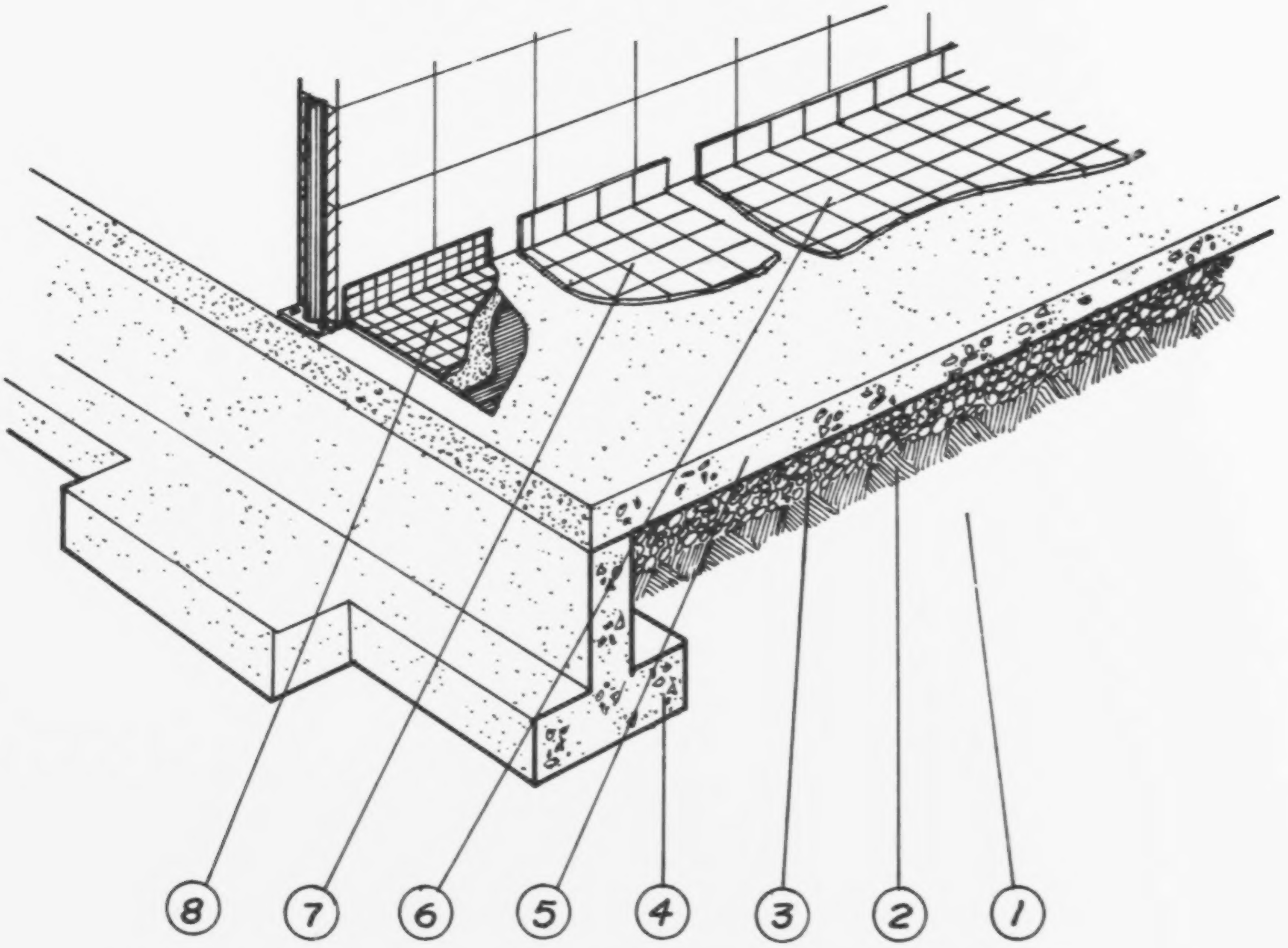


BELOW GRADE AND GROUND FLOOR 26,000 square feet = $182,800
C - Ratio (Component in Square Feet/OGSF) = 0.30

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Foundation | | 2.62 | 2.62 | | |
| 2. Basement Floor Membrane | | 0.09 | 0.09 | | |
| 3. Finish Basement Rooms | | 0.56 | 0.56 | L | L |
| 4. Finish Basement Slab | | 0.07 | 0.07 | L | |
| 5. Excavation | | 0.46 | 0.46 | | |
| 6. Grading | | 0.72 | 0.71 | | |
| 7. Cripple Walls | | 0.25 | 0.25 | | |
| 8. Wood Framing | | 0.25 | 0.25 | | |
| 9. Plywood Sheathing | | 0.25 | 0.25 | | |
| 10. Metal Lath & Plaster | | 0.16 | 0.16 | | |
| 11. Ceramic Tile | 0.04 | | 0.04 | H | |
| 12. Waterproof Membrane | 0.01 | | 0.01 | | |
| 13. Carpet and Pad | | 1.08 | 1.08 | H | H |
| 14. Resilient Flooring | | 0.05 | 0.05 | H | H |
| 15. Joist Hangers | | 0.15 | 0.15 | | |
| 16. Ceiling Paint (not shown) | | 0.04 | 0.04 | L | H |
| 17. Concrete Stairs (not shown) | | 0.25 | 0.25 | L | |
| | 0.05 | 6.98 | 7.03 | | |

Installed Cost Including Overhead & Profits $211,142 @$8.12/square foot

RESIDENCE HALL NO. 3, CROWN, SANTA CRUZ



BELOW GRADE AND GROUND FLOOR 45,940 square feet = $217,270
C - Ratio (Component in Square Feet/OGSF) = 0.61

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Bath | Non-System | | Cust. | Maint. |
| 1. Trenching | | 0.15 | 0.15 | | |
| 2. Grading and Compacted Fill | | 0.93 | 0.93 | | |
| 3. Crushed Rock | | 0.08 | 0.08 | | |
| 4. Concrete Footings | | 2.06 | 2.06 | | |
| 5. 4" Concrete Slab | | 1.00 | 1.00 | | |
| 6. Asphalt Tile | | 0.19 | 0.19 | H | H |
| 7. Rubber Tile | | 0.18 | 0.18 | H | H |
| 8. Ceramic Tile | 0.15 | | 0.15 | H | |
| | 0.15 | 4.59 | 4.74 | | |

Installed Cost Including Overhead & Profit $250,950 @$5.46/square foot.

RESIDENCE HALL NO. 2, ANACAPA, SANTA BARBARA

## FLOOR SYSTEM COMPONENT COSTS (TYPE I BUILDINGS)

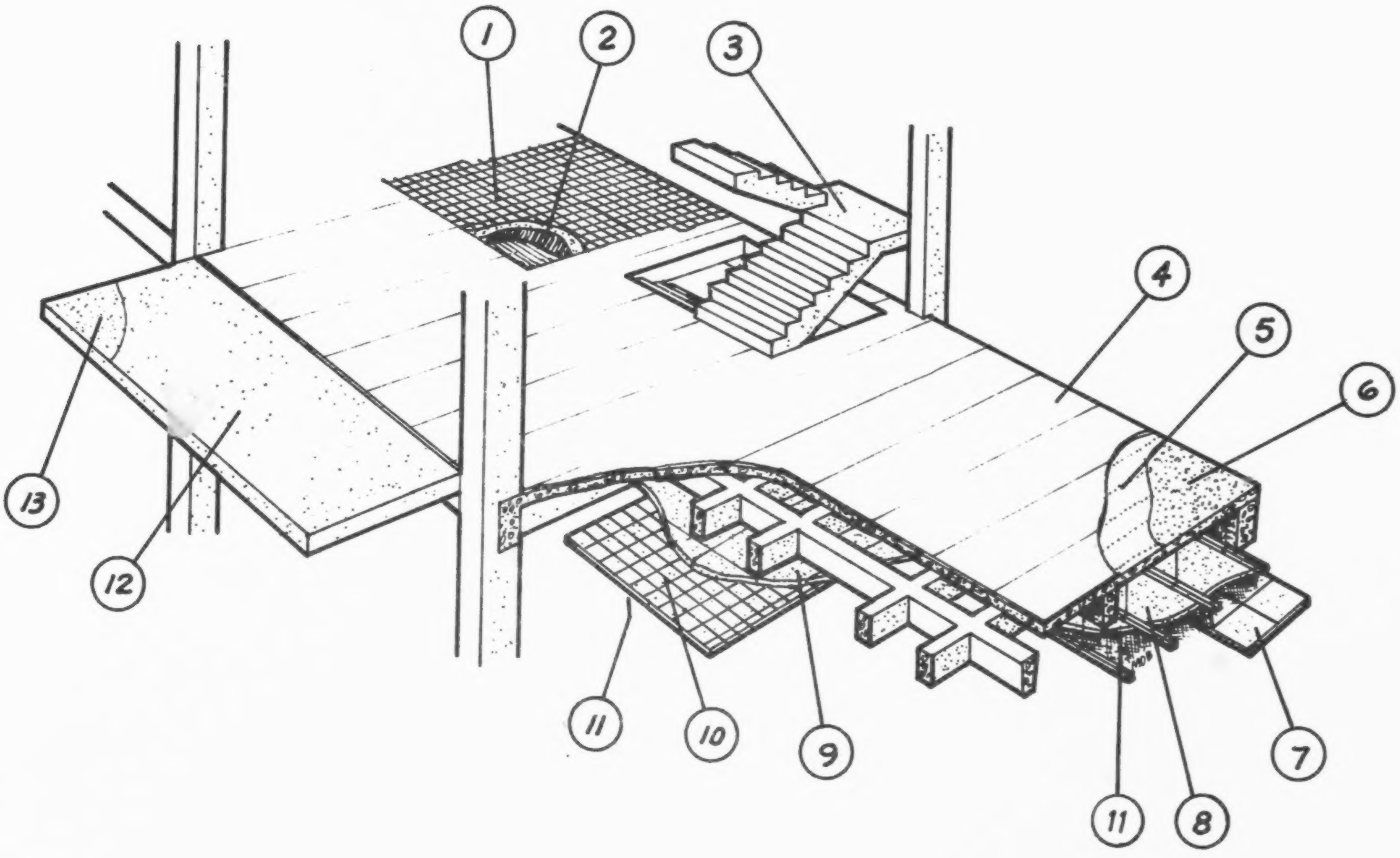
| | CONSTRUCTION COST | | | URBS COMPONENT EQUIVALENT per O.G.S.F. | |
|---|---|---|---|---|---|
| | Per sq. ft. of component | Per Resident | Per OGSF | Structure-Ceiling | Bathrooms |
| Priestly Hall<br>BERKELEY | $5.62* | $965* | $5.16* | $3.67<br>71% | $0.37<br>7% |
| Ryerson Hall<br>DAVIS | $5.16 | $891 | ($4.13) | $3.01<br>73% | $0.32<br>8% |
| Hedrick Hall<br>LOS ANGELES | ($4.90) | ($844) | $4.25 | $3.07<br>72% | $0.23<br>5% |
| Lothian Hall<br>RIVERSIDE | $4.27 | $529 | $3.20 | $2.18<br>68% | $0.43<br>13% |
| Revelle Hall<br>SAN DIEGO | $4.36 | $676 | $3.64 | $2.13<br>59% | $0.12<br>3% |

* High ( ) Median _____ Low

Type I buildings must have fire resistive construction; the buildings studied have floor systems of reinforced concrete. The simplest floor system, at Lothian Hall, is a flat-plate lift-slab with exposed concrete ceilings. The most expensive floor system, at Priestly Hall, has elaborate concrete framing with a full suspended ceiling. Hedrick Hall is median in cost, having a simply framed concrete floor system with a partial suspended ceiling. Revelle Hall is fully carpeted.

The URBS component equivalents in this tabulation are Structure-ceiling and Bathrooms. Structure-ceiling encompasses everything in the floor sub-system except the finished flooring and the bathroom finishes.

Ceramic tile floors are sources of maintenance trouble due to water leaks. Bathroom finishes in general receive heavy custodial care. Acoustical tile finishes are often susceptible to damage; most finishes receive rough treatment.

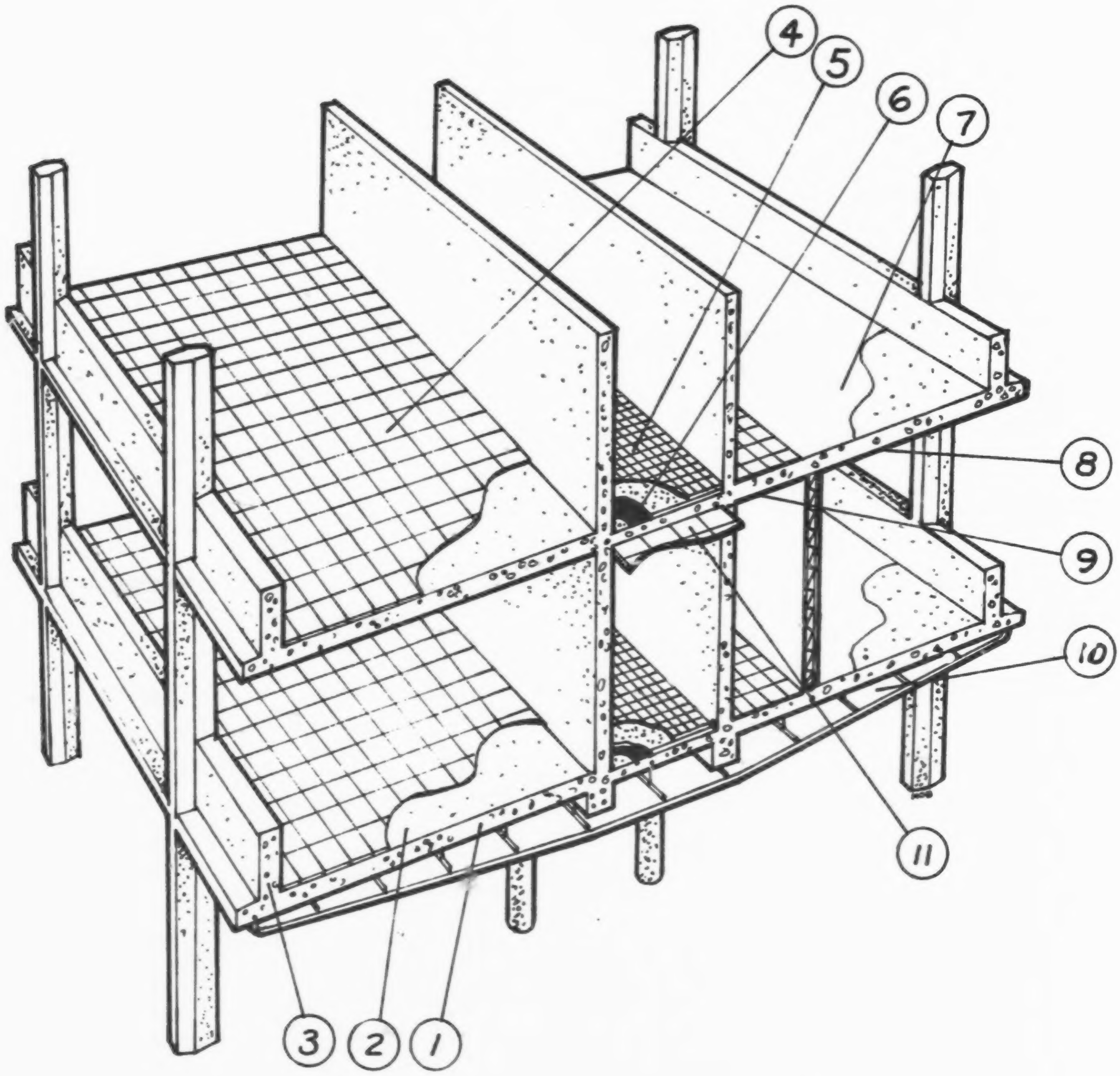


FLOOR SYSTEM 36,700 square feet = $178,710
C - Ratio (Component in Square Feet/OGSF) = 0.92

| | | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. | Ceramic Tile Floor | 0.28 | | | 0.28 | H | H |
| 2. | Waterproof Membrane | 0.04 | | | 0.04 | | H |
| 3. | Concrete Stairs | | 0.44 | | 0.44 | L | |
| 4. | Linoleum Flooring | | | 0.47 | 0.47 | H | L |
| 5. | Finish Concrete | | 0.13 | | 0.13 | | |
| 6. | Concrete Beams & Slab | | 2.51 | | 2.51 | | |
| 7. | Hung Gypsum Board Ceiling | | 0.45 | | 0.45 | | |
| 8. | Hung Metal Lath & Plaster | .07 | | | 0.07 | | L |
| 9. | Mineral Acoustic Tile | | 0.21 | | 0.21 | | H |
| 10. | Fibre Acoustic Tile | | 0.22 | | 0.22 | | H |
| 11. | Ceiling Paint | 0.01 | | | 0.01 | H | H |
| 12. | Balcony Concrete | | 0.03 | | 0.03 | | |
| 13. | Finish Balcony Slab | | 0.01 | | 0.01 | L | |
| | | 0.40 | 4.00 | 0.47 | $4.87 | per square foot | |

Installed Cost Including Overhead and Profit = $206,410 @ $5.62/sq. foot

RESIDENCE HALL NO. 3, PRIESTLY: BERKELEY

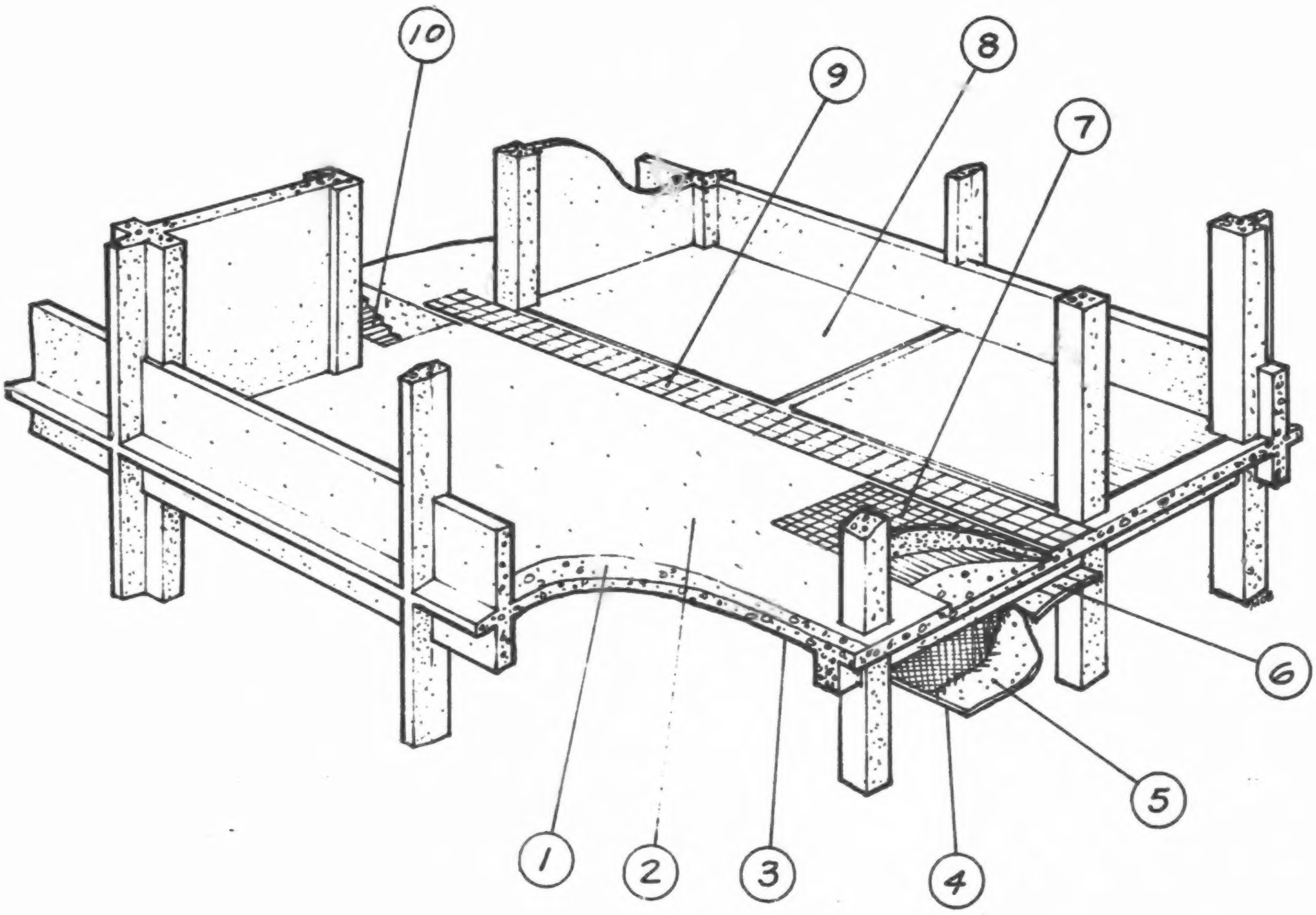


FLOOR SYSTEM 35,200 square feet = $157,950
C - Ratio (Component in Square Feet/OGSF) = 0.80

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Concrete Slab | | 2.61 | | 2.61 | | |
| 2. Slab Finish | | 0.16 | | 0.16 | | |
| 3. Concrete Beams | | 0.54 | | 0.54 | | |
| 4. Vinyl Asbestos Tile | | | 0.31 | 0.31 | H | H |
| 5. Ceramic Tile | 0.25 | | | 0.25 | H | H |
| 6. Waterproof Membrane | 0.06 | | | 0.06 | | H |
| 7. Color Cement Floor | | | 0.01 | 0.01 | L | |
| 8. Ceiling Paint - Spray | | 0.06 | | 0.06 | | L |
| 9. Ceiling Paint - Enamel | 0.01 | | | 0.01 | H | H |
| 10. Metal Lath and Plaster | | 0.16 | | 0.16 | | L |
| 11. Acoustic Tile | 0.08 | | | 0.08 | | H |
| 12. Concrete Stairs (Not Shown) | | 0.22 | | 0.22 | L | |
| | 0.40 | 3.76 | 0.32 | 4.48 | | |

Installed Cost Including Overhead & Profit $181,739 @ $5.16/square foot.

RESIDENCE HALL NO. 5, RYERSON HALL, DAVIS

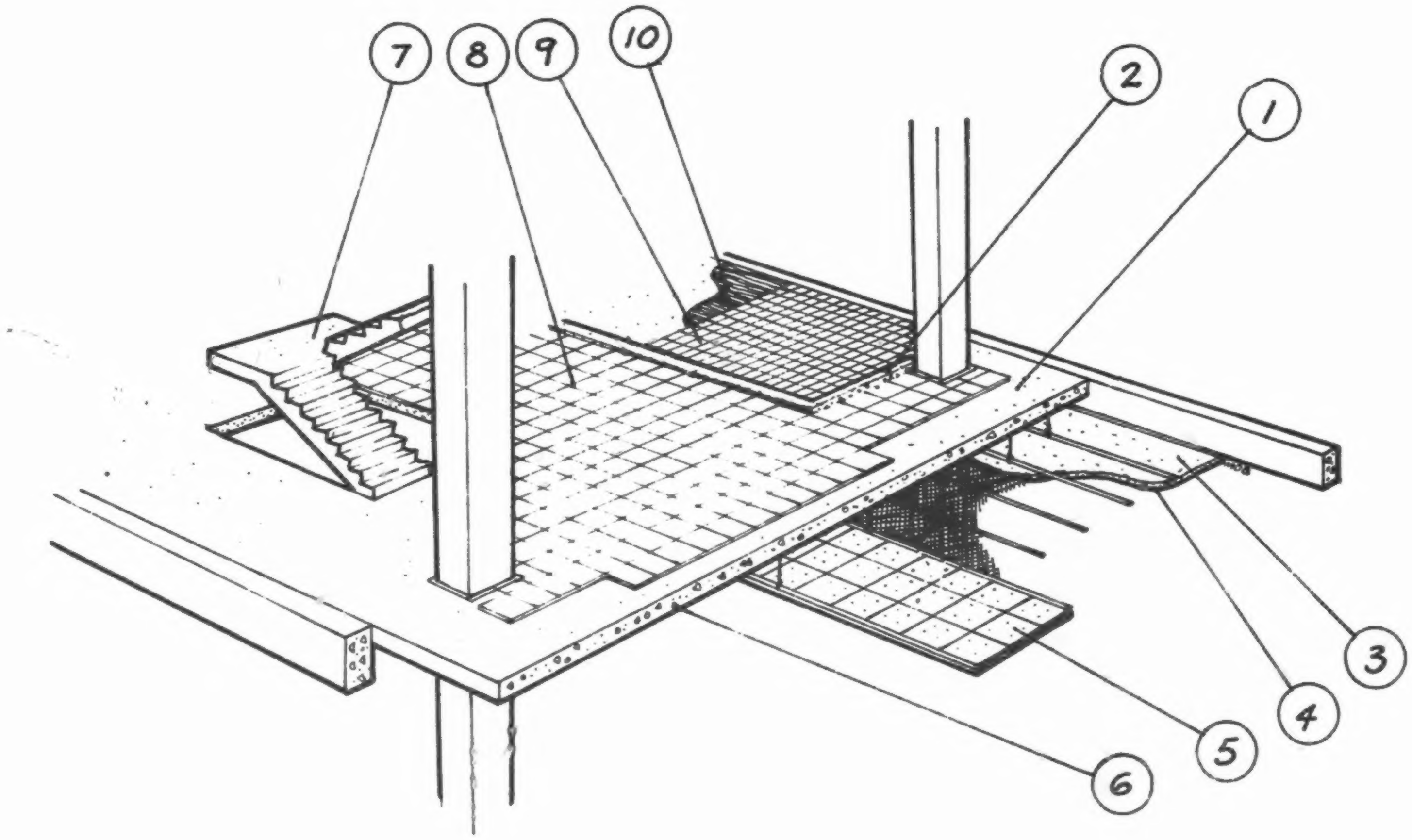


FLOOR SYSTEM 144,000 square feet = $611,000
C - Ratio (Component in Square Feet/OGSF) =0.87

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure Ceiling | Non-System | | Cust. | Maint. |
| 1. Concrete Slab and Beams | | 2.90 | | 2.90 | | |
| 2. Concrete Finish | | 0.16 | | 0.16 | | |
| 3. Paint on Ceiling | | 0.10 | | 0.10 | L | H |
| 4. Keene's Cement Ceiling Finish | 0.01 | | | 0.01 | | |
| 5. Hung Metal Lath and Plaster Ceiling | 0.11 | 0.12 | | 0.23 | | L |
| 6. Acoustic Tile Ceiling Finish | | 0.11 | | 0.11 | | L |
| 7. Ceramic Tile Flooring | 0.14 | | | 0.14 | H | H |
| 8. Linoleum Flooring | | | 0.35 | 0.35 | H | L |
| 9. Vinyl-Asbestos Flooring | | | 0.06 | 0.06 | H | H |
| 10. Concrete Stairs | | 0.15 | | 0.15 | L | |
| 11. Hung Plaster Soffit, with Insul. | | | | | | |
| | 0.26 | 3.54 | 0.44 | 4.24 | | |

Installed Cost Including Overhead & Profit $705,700 @ $4.90/square foot

RESIDENCE HALL NO. 4, HEDRICK, LOS ANGELES

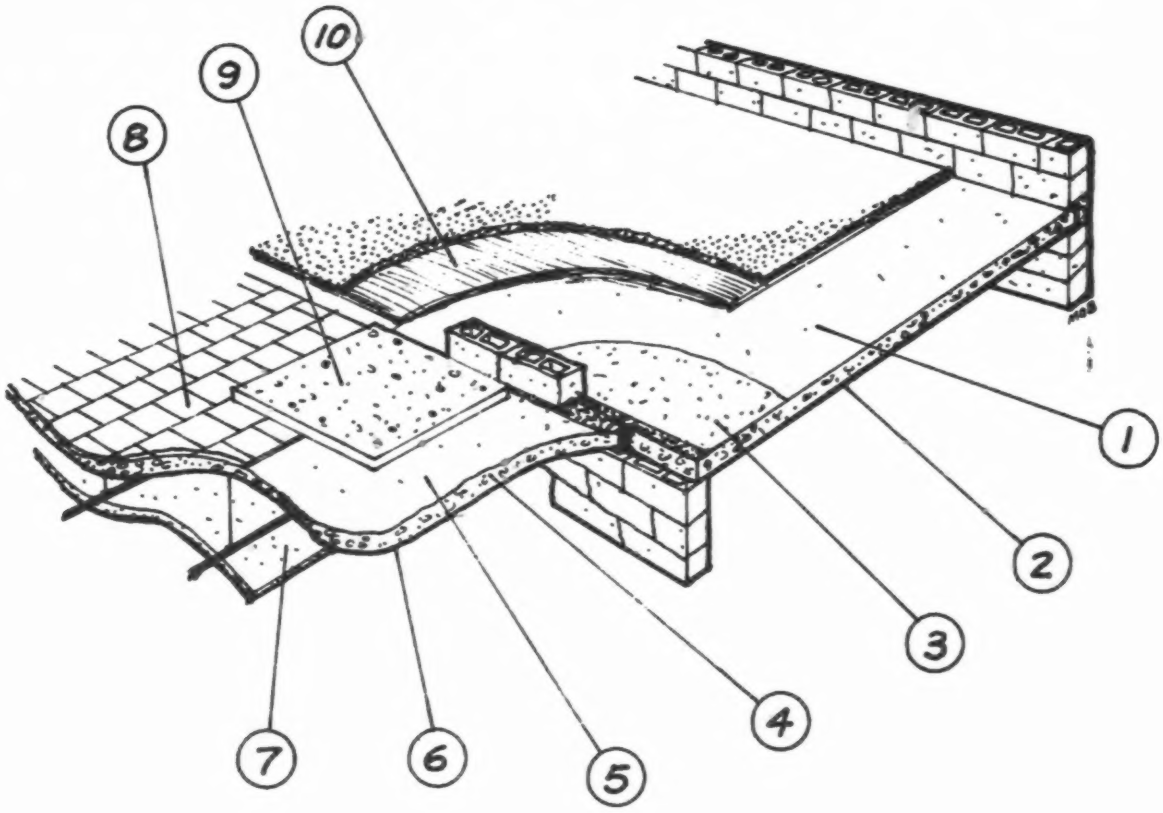


FLOOR SYSTEM 52,200 square feet = $193,290
C - Ratio (Component in Square Feet/OGSF) = 0.75

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Concrete Lift-Slab | | 2.44 | | 2.44 | | |
| 2. Concrete Curb | | .01 | | 0.01 | | |
| 3. Hung Metal Lath & Plaster | .14 | | | 0.14 | | L |
| 4. Paint Hung Ceiling | .04 | | | 0.04 | L | H |
| 5. Suspended Acoustic Tile | | 0.20 | | 0.20 | | H |
| 6. Paint Exposed Ceiling | | 0.09 | | 0.09 | L | H |
| 7. Concrete Stairs | | 0.16 | | 0.16 | L | |
| 8. Asphalt Tile Flooring | | | 0.24 | 0.24 | H | H |
| 9. Ceramic Tile Flooring | 0.34 | | | 0.34 | H | H |
| | 0.05 | | | 0.05 | | H |
| | 0.57 | 2.90 | 0.24 | 3.71 | | |

Installed Cost Including Overhead & Profit = $223,250 @ $4.27/sq.foot

RESIDENCE HALL NO. 4, LOTHIAN HALL, RIVERSIDE



FLOOR SYSTEM 68,460 square feet = $258,910
C - Ratio (Component in Square Feet/OGSF) = 0.11

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Struc-Ceil | Non-System | | Cust. | Maint. |
| 1. Precast 6" Concrete Slab | | 1.72 | | 1.72 | | |
| 2. Paint on Concrete | | 0.06 | | 0.06 | L | H |
| 3. Finish Concrete | | 0.15 | | 0.15 | | |
| 4. Concrete Slab | | 0.23 | | 0.23 | | |
| 5. Concrete Floor Finish | | | 0.01 | 0.01 | L | |
| 6. Sandblast exposed Concrete | | 0.02 | | 0.02 | | |
| 7. Hung Plaster Ceiling | 0.07 | 0.07 | | 0.14 | | L |
| 8. Vinyl Asbestos Flooring | 0.02 | | | 0.02 | H | H |
| 9. Terrazzo Shower Floor and Curb | 0.05 | | | 0.05 | H | H |
| 10. Carpet and Pad | | | 1.07 | 1.07 | H | H |
| 11. Concrete Stairs (not shown) | | 0.31 | | 0.31 | L | |
| | 0.14 | 2.56 | 1.08 | 3.78 | | |

Installed Cost Including Overhead & Profit $299,040 @ $4.36/square foot

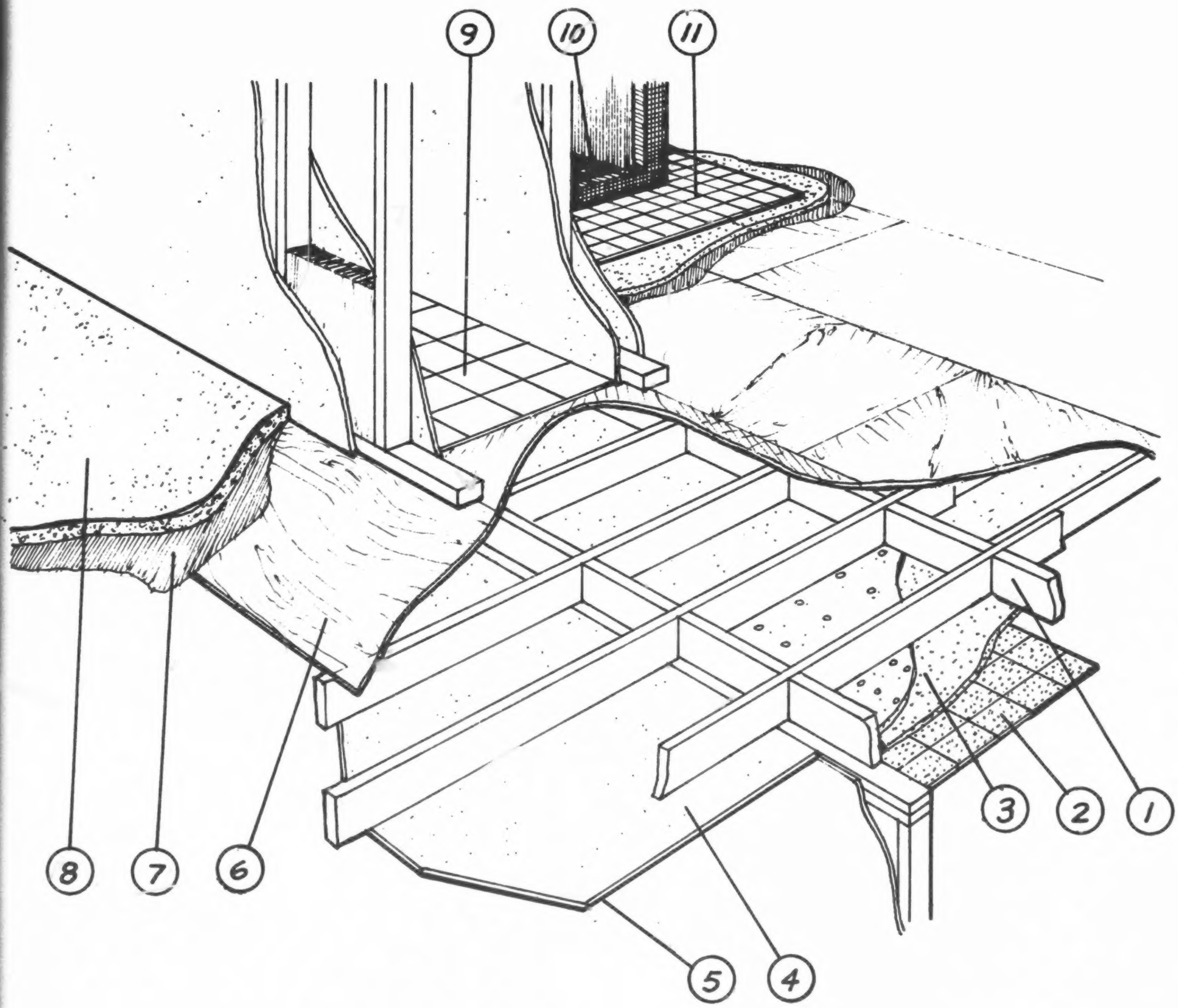
RESIDENCE HALL NO. 1, REVELLE, SAN DIEGO

## FLOOR SYSTEM COMPONENT COSTS (TYPE III - V BUILDINGS)

| | CONSTRUCTION COST | | | URBS COMPONENT EQUIVALENT per O.G.S.F. | |
|---|---|---|---|---|---|
| | Per sq. ft. of Component | Per Resident | Per OGSF | Structure-ceiling | Bathrooms |
| Regan Hall<br>DAVIS | $2.87 | $317 | $1.60 | $1.11<br>69% | $0.17<br>11% |
| Mesa Court<br>IRVINE | ($3.45) | ($381) | ($1.86) | $0.90<br>48% | $0.12<br>7% |
| Cowell College<br>SANTA CRUZ | $2.96 | $469 | $2.06 | $1.40<br>68% | $0.24<br>12% |
| Crown College<br>SANTA CRUZ | $3.61 | $490* | $2.24* | $1.14<br>51% | $0.11<br>5% |
| Anacapa Hall<br>SANTA BARBARA | $3.78* | $295 | $1.65 | $1.17<br>71% | $0.09<br>5% |

* High ( ) Median _____ Low

The concrete slab floor system of Anacapa Hall is the most expensive in unit cost in this group of buildings. However, since this is only a two-story building and the ground floor area is not included in this tabulation, its cost per O.G.S.F. is less than some of the others. All of the wood floor systems, except Crown College, incorporate insulating concrete slabs. Mesa Court and Crown College are carpeted. There is insufficient experience with the carpeting installation to draw economic conclusions, but there are very favorable reactions to the comfort provided. The relationship of carpeting to bathroom floors at Mesa Court has created problems.

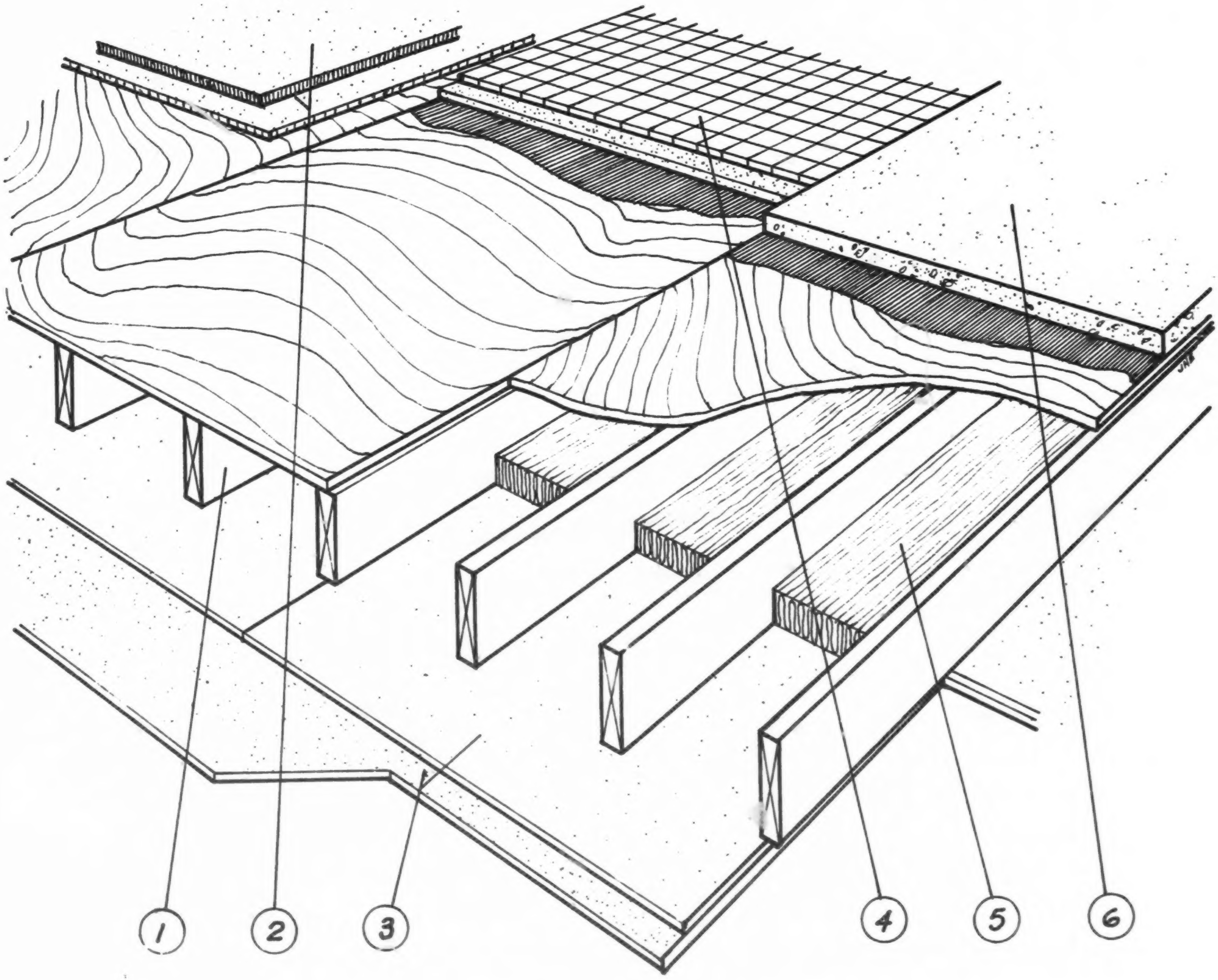


FLOOR SYSTEM 46,288 square feet = $115,219

C - Ratio (Component in Square Feet/OGSF) = 0.56

| | | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. | Wood Framing | | 0.60 | | 0.60 | | |
| 2. | Acoustic Tile | | 0.06 | | 0.06 | | H |
| 3. | Plaster on Gypsum Lath | 0.06 | | | 0.06 | | |
| 4. | 5/8" Gypsum Board Ceiling | | 0.32 | | 0.32 | | L |
| 5. | Paint | 0.02 | 0.12 | | 0.14 | L | H |
| 6. | 5/8" Plywood Subfloor | | 0.38 | | 0.38 | | |
| 7. | Waterproof Membrane | 0.03 | | | 0.03 | | H |
| 8. | Insulating Concrete | | 0.35 | | 0.35 | | |
| 9. | Vinyl Asbestos Flooring | | | 0.19 | 0.19 | H | H |
| 10. | Terazzo at Showers | 0.02 | | | 0.02 | H | H |
| 11. | Ceramic Tile | 0.18 | | | 0.18 | H | H |
| 12. | Stairs (not shown) | | 0.16 | | 0.16 | L | |
| | | 0.31 | 1.99 | 0.19 | $2.49 | | |

Installed Cost Including Overhead & Profit = $133,079 @ $2.87/sq.foot



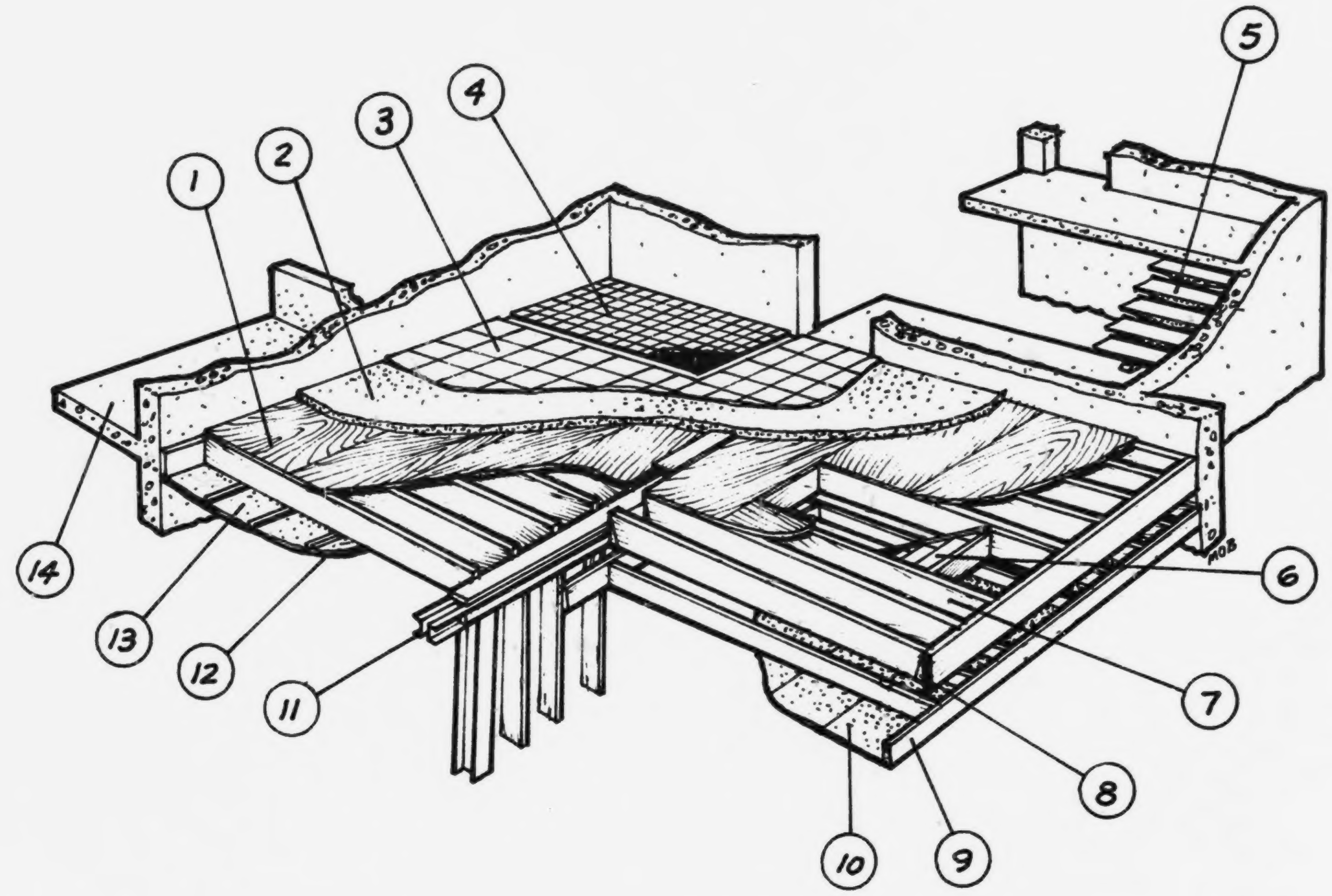
FLOOR SYSTEM 45,000 square feet = $134,540

C - Ratio (Component in Square Feet/OGSF) = 0.54

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Wood Framing | | 0.89 | | 0.89 | | |
| 2. Carpet & Padding | | | 1.10 | 1.10 | H | H |
| 3. Gypsum Lath & Plaster | 0.10 | 0.25 | | 0.35 | | |
| 4. Ceramic Tile | 0.13 | | | 0.13 | H | H |
| 5. Thermal Insulation | | 0.14 | | 0.14 | | |
| 6. Lightweight Concrete Slab | | 0.29 | | 0.29 | | |
| 7. Wood Stairs (not shown) | | 0.08 | | 0.08 | L | |
| | 0.23 | 1.65 | 1.10 | $2.98 | | |

Installed Cost Including Overhead & Profit = $155,394 @ $3.45/sq. foot

RESIDENCE HALL NO. 1, MESA COURT: IRVINE

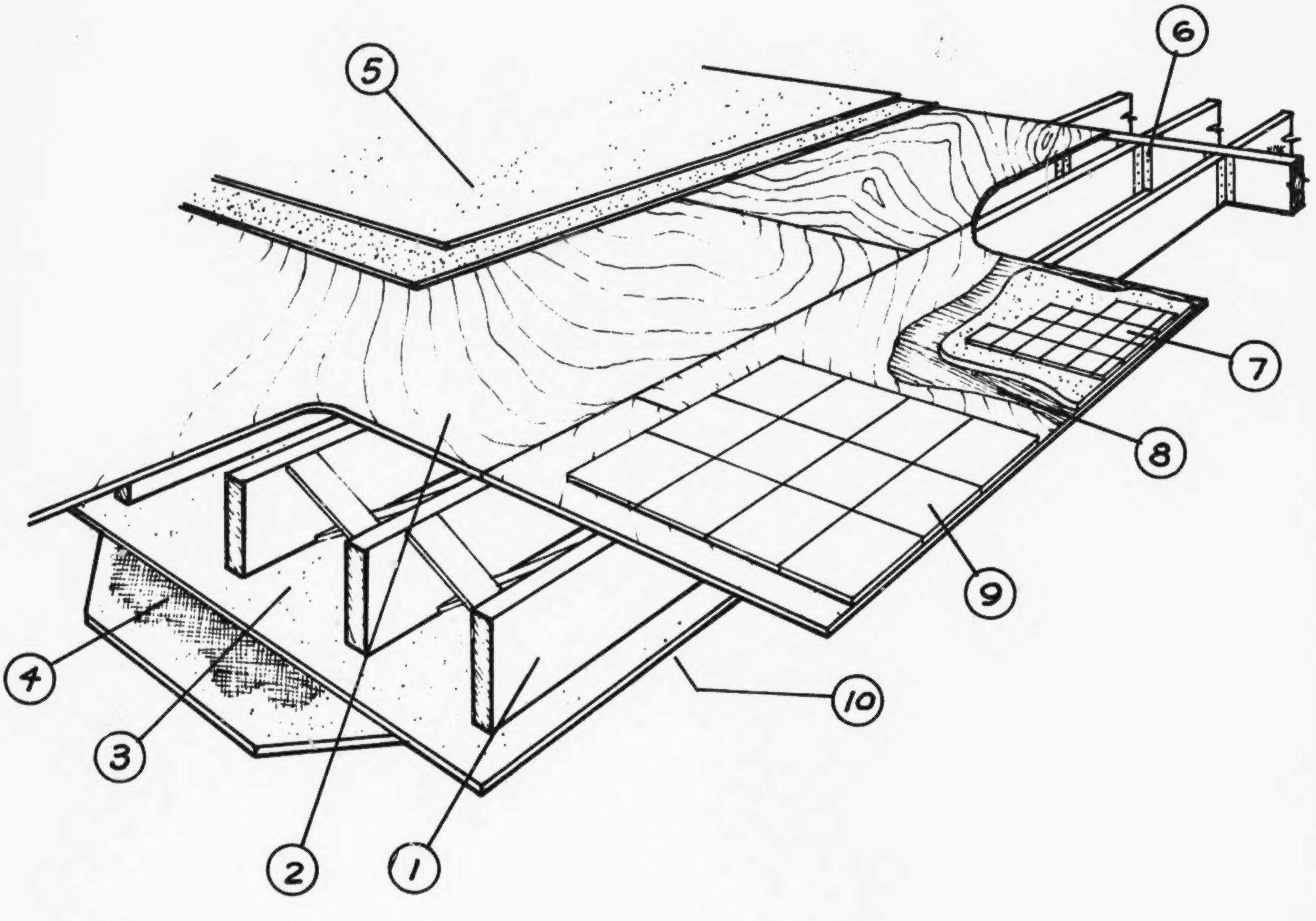


FLOOR SYSTEM 66,000 square feet = $169,120
C-Ratio (Component in Square Feet/OGSF) = 0.69

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Plywood Diaphragm | | 0.24 | | 0.24 | | |
| 2. Concrete Floor | | 0.12 | | 0.12 | | |
| 3. Vinyl Asbestos Tile | | | 0.21 | 0.21 | H | H |
| 4. Ceramic Floor Tile | 0.23 | | | 0.23 | H | H |
| 5. Concrete Stairs | | 0.72 | | 0.72 | L | |
| 6. Wood Stairs | | 0.08 | | 0.08 | L | |
| 7. Wood Framing | | 0.33 | | 0.33 | | |
| 8. Joist Hangers | | 0.06 | | 0.06 | | |
| 9. Ceiling Furring | 0.07 | | | 0.07 | | |
| 10. Gypsum Board | | 0.20 | | 0.20 | | |
| 11. Steel Channels | | 0.02 | | 0.02 | | |
| 12. Paint | | 0.13 | | 0.13 | L | H |
| 13. Gypsum Board | | 0.05 | | 0.05 | | |
| 14. Concrete Balcony | | 0.06 | | 0.06 | L | |
| 15. Gypsum Plaster (not shown) | 0.02 | | | 0.02 | | L |
| 16. Ceramic Tile Ceiling (not shown) | 0.03 | | | 0.03 | H | H |
| | 0.35 | 2.01 | 0.21 | 2.57 | | |

Installed Cost Including Overhead & Profit $195,333 @ $2.96/square foot

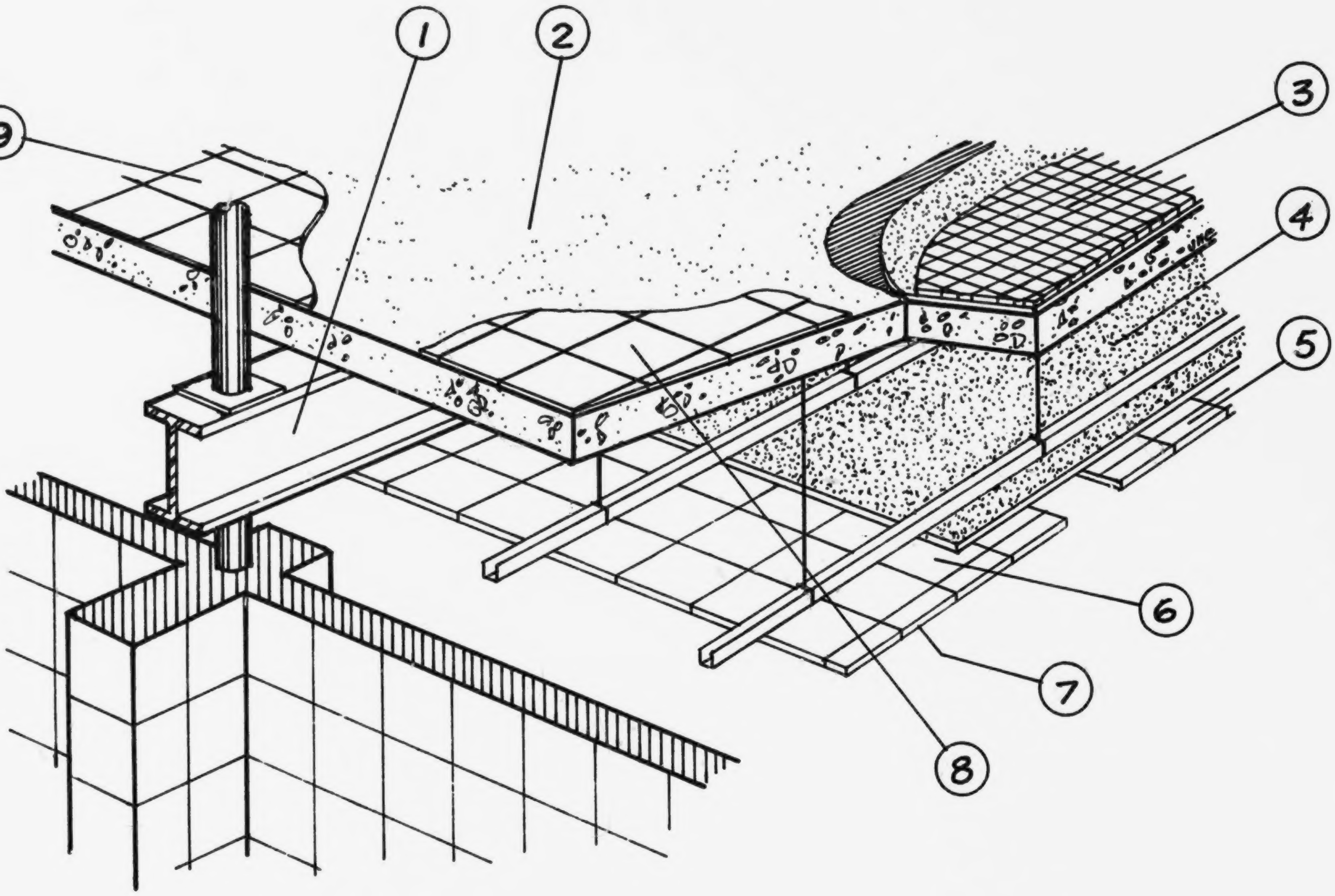
RESIDENCE HALL NO. 1, COWELL, SANTA CRUZ



FLOOR SYSTEM 53,320 square feet = $169,884
C - Ratio (Component in Square Feet/OGSF) = 0.62

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Wood Framing | | 0.26 | | 0.26 | | |
| 2. Plywood Sheathing | | 0.25 | | 0.25 | | |
| 3. Gupsum Board | | 0.24 | | 0.24 | | |
| 4. Metal Lath & Plaster | 0.11 | | | 0.11 | | |
| 5. Carpet & Padding | | | 1.08 | 1.08 | H | H |
| 6. Joist Hangers | | 0.15 | | 0.15 | | |
| 7. Ceramic Tile | 0.04 | | | 0.04 | H | H |
| 8. Waterproof Memberane | 0.01 | | | 0.01 | | H |
| 9. Resilient Tile | | | 0.04 | 0.04 | H | H |
| 10. Ceiling Paint | | 0.15 | | | L | H |
| 11. Concrete Stairs (not shown) | | 0.80 | | 0.80 | L | |
| | 0.16 | 1.85 | 1.12 | 3.13 | | |

Installed Cost Including Overhead & Profit = $196,216 @ $3.61/sq. foot



FLOOR SYSTEM    32,734 square feet = $107,170
C - Ratio (Component in Square Feet/OGSF) = 0.44

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Steel Beams | | 0.06 | | 0.06 | | |
| 2. Floor Slab | | 1.73 | | 1.73 | | |
| 3. Ceramic Tile Floor (with membrane) | 0.19 | | | 0.19 | H | H |
| 4. Suspended Plaster Ceiling | | 0.55 | | 0.55 | | |
| 5. Acoustic Tile | | 0.10 | | 0.10 | | H |
| 6. Enamel Finish Acoustic Tile | 0.02 | | | 0.02 | H | H |
| 7. Ceiling Paint | | 0.11 | | 0.11 | L | H |
| 8. Rubber Tile Flooring | | | 0.14 | 0.14 | H | H |
| 9. Asphalt Tile Flooring | | | 0.19 | 0.19 | H | |
| 10. Stairs | | 0.12 | | 0.12 | | |
| 11. Drapery Track (not shown) | | | 0.06 | 0.06 | | |
| | 0.21 | 2.67 | 0.39 | 3.27 | | |

Installed Cost Including Overhead & Profit = $123,778 @ $3.78/sq. foot

RESIDENCE HALL NO. 2, ANACAPA HALL; SANTA BARBARA

## ROOF SYSTEM COMPONENT COSTS (TYPE I BUILDINGS

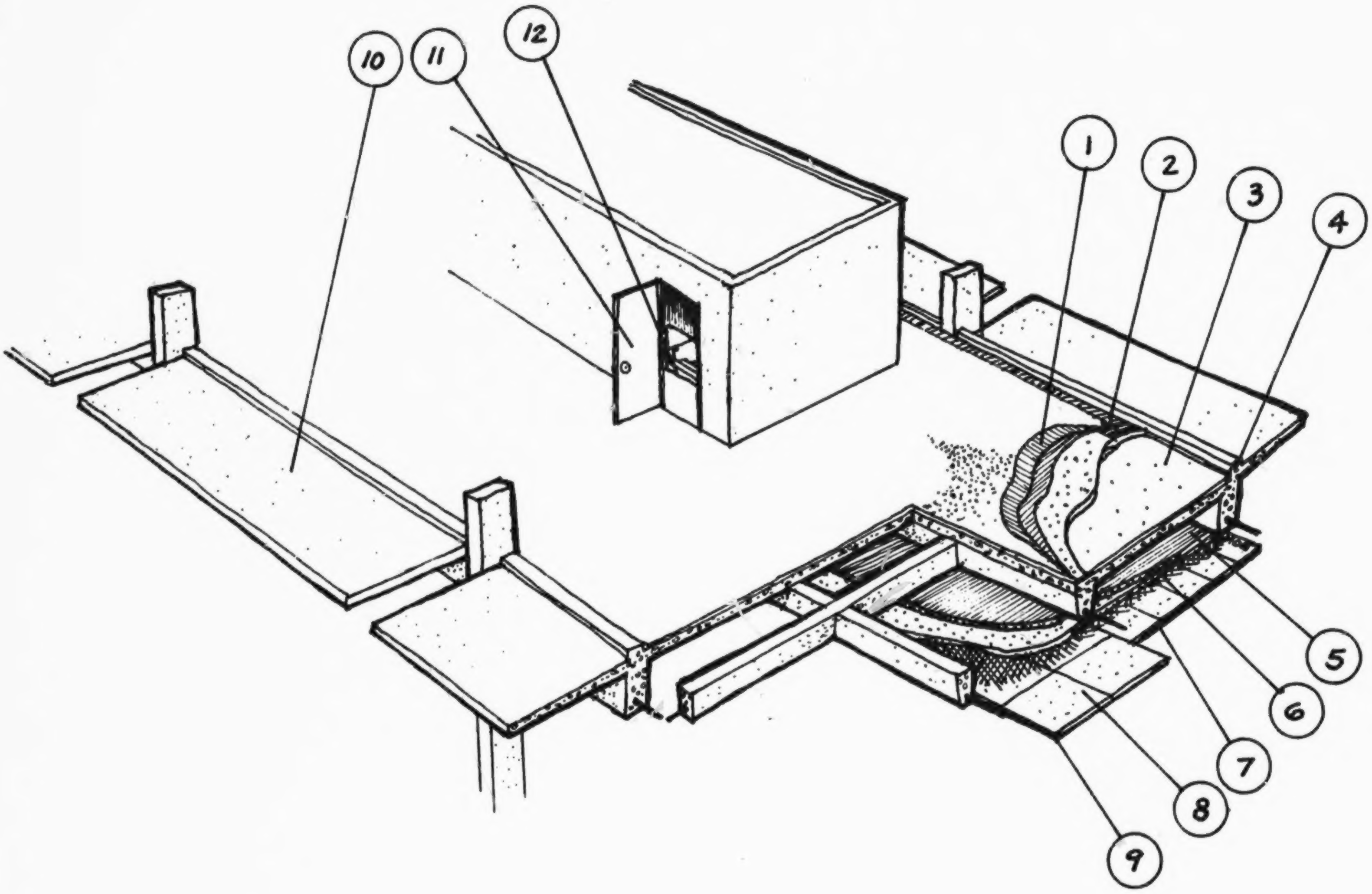
| | CONSTRUCTION COST | | | URBS COMPONENT EQUIVALENT per O.G.S.F. | |
|---|---|---|---|---|---|
| | Per sq. ft. of component | Per Resident | Per OGSF | Structure-Ceiling | Bathrooms |
| Priestly Hall<br>BERKELEY | $5.88* | ($172) | $0.91 | $0.62 | $0.01<br>1% |
| Ryerson Hall<br>DAVIS | $5.10 | $220* | ($1.02) | $0.72<br>71% | $0.02<br>2% |
| Hedrick Hall<br>LOS ANGELES | ($4.30) | $151 | $0.76 | $0.52<br>68% | $0.01<br>2% |
| Lothian Hall<br>RIVERSIDE | $4.18 | $172 | $1.05 | $0.66<br>63% | $0.05<br>5% |
| Revelle Hall<br>SAN DIEGO | $3.24 | $206 | $1.11* | $0.73<br>66% | $0.01<br>1% |

* High　　( ) Median　　_____ Low

The taller buildings have the highest unit costs for roof construction, but relatively low costs per O.G.S.F. because of their low C-Ratio (square feet of component/ O.G.S.F.).

The URBS Performance Specifications do not include roofing material, but does include the structure and ceiling required for roofs. The bathroom component listed represents bathroom ceilings.

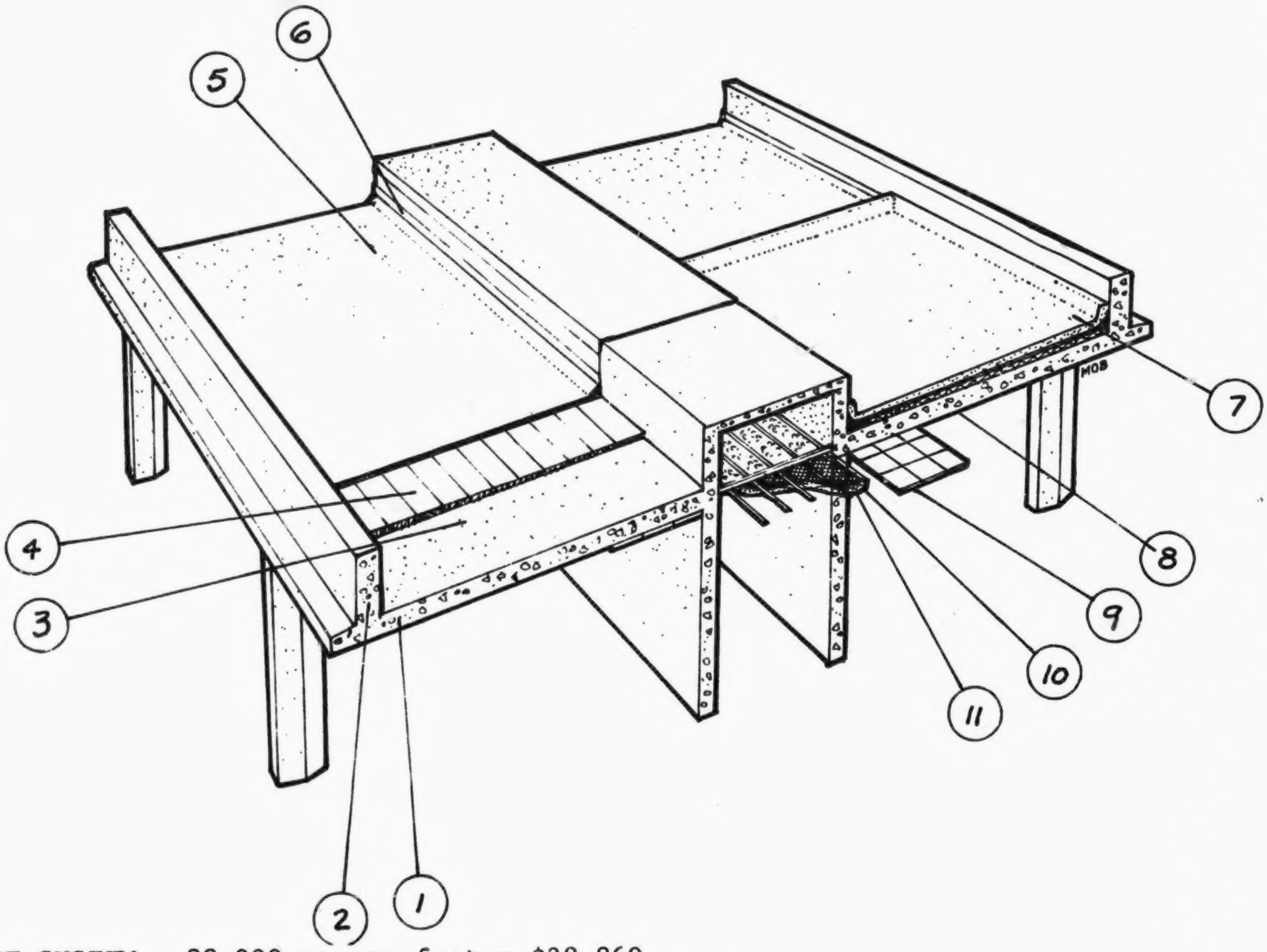
All of the Type I roofs are composition and gravel over concrete slabs.



ROOF SYSTEM    6,245 square feet = $31,785
C - Ratio   (Component in Square Feet/OGSF = 0.15

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Roofing | | | .22 | $0.22 | | |
| 2. Sheet Metal | | | .19 | 0.19 | | |
| 3. Lightweight Fill | | | .36 | 0.36 | | |
| 4. Concrete Slabs, Beams, Curbs and Penthouse | | 3.20 | | 3.20 | | |
| 5. Blanket Insulation | | | .13 | 0.13 | | |
| 6. Suspended Ceiling | .08 | .30 | | 0.38 | | L |
| 7. Acoustic Tile, Fiber | | .19 | | 0.19 | | L |
| 8. Acoustic Tile, Mineral | | .12 | | 0.12 | | L |
| 9. Ceiling Paint, Enamel | .01 | | | 0.01 | H | L |
| 10. Exterior Paint, Shades | | .07 | | 0.07 | | L |
| 11. Hollow Metal Doors | | | .16 | 0.16 | | L |
| 12. Concrete Stairs | | .07 | | 0.07 | | |
| | .09 | 3.95 | 1.06 | $5.10 per sq.ft. | | |

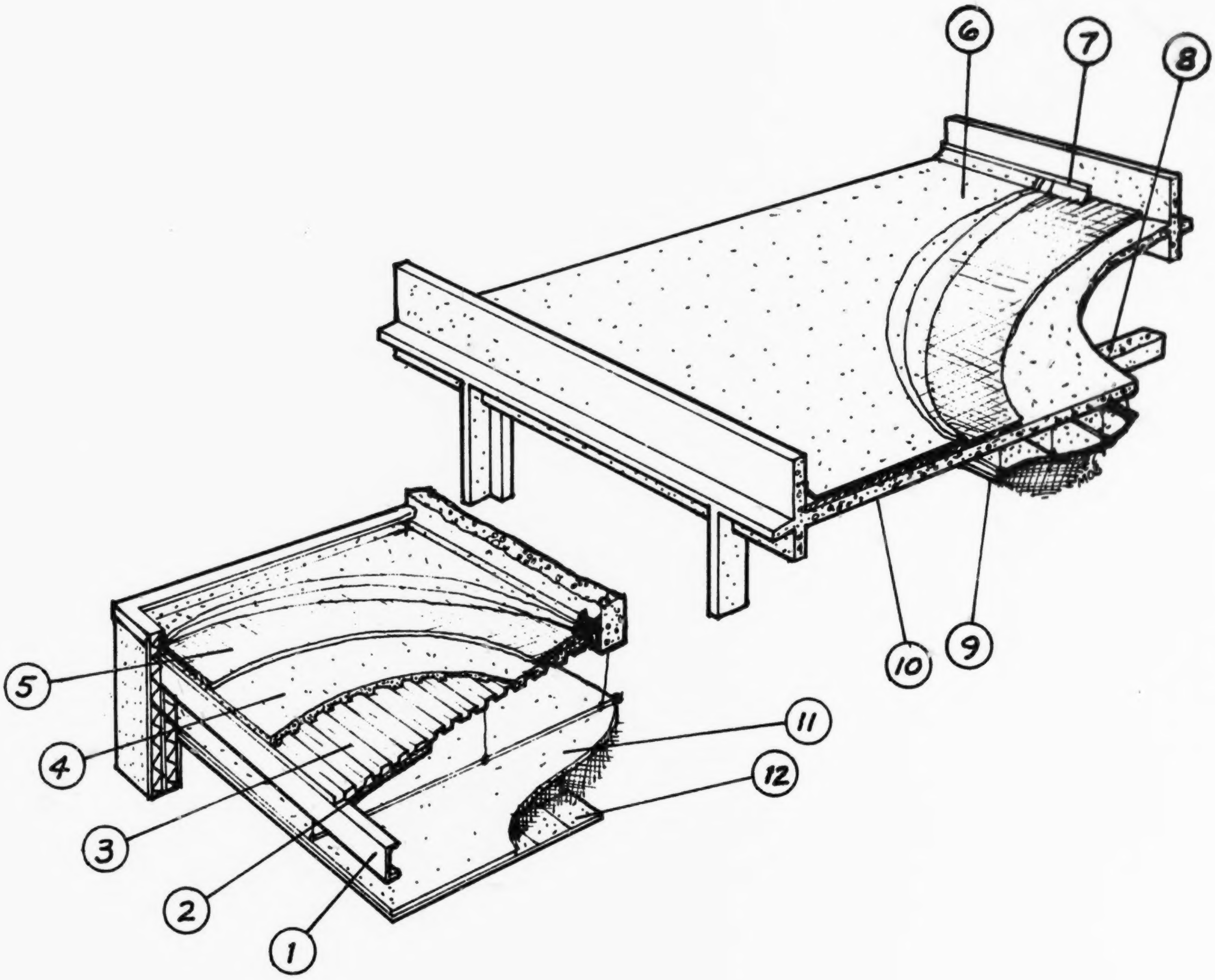
Installed Cost Including Overhead & Profit $36,712 @ $5.88/square foot



ROOF SYSTEM 88,000 square feet = $38,860
C - Ratio (Component in Square Feet/OGSF) = 0.20

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Concrete Slab | | 2.61 | | 2.61 | | |
| 2. Concrete Beams | | 0.46 | | 0.46 | | |
| 3. Slab Finish | | 0.11 | | 0.11 | | |
| 4. Insulation | | | 0.24 | 0.24 | | |
| 5. Roofing | | | 0.31 | 0.31 | | L |
| 6. Sheetmetal | | | 0.14 | 0.14 | | |
| 7. Sundeck Slab | | | 0.03 | 0.03 | | |
| 8. Ceiling Paint Spray | | 0.07 | | 0.07 | L | H |
| 9. Acoustic Tile | 0.10 | | | 0.10 | L | L |
| 10. Hung Metal Lath & Plaster | | | | 0.14 | | |
| 11. Ceiling Paint Enamel | 0.02 | | | 0.02 | L | H |
| 12. Concrete Stairs (not shown) | | 0.19 | | 0.19 | | |
| | 0.12 | 3.58 | 0.72 | 4.42 | | |

Installed Cost Including Overhead & Profit $44,883 @ $5.10/square foot

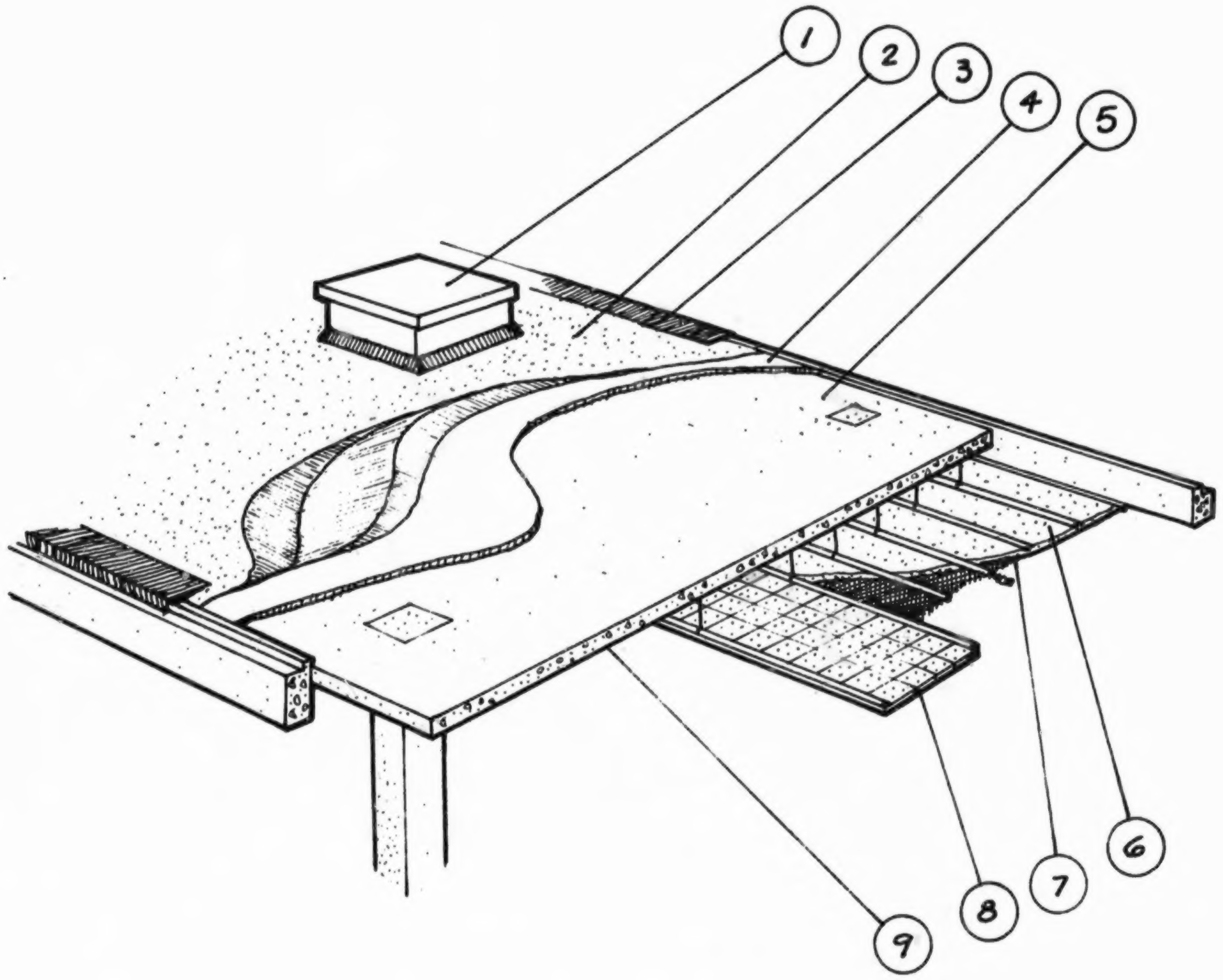


ROOF SYSTEM    29,430 square feet = $109,490
C- Ratio (Component in Square Feet/OGSF) = 0.18

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | HVC | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Steel Framing | | | 0.22 | | 0.22 | | |
| 2. Fireproofing Insulation | | | 0.05 | | 0.05 | | |
| 3. Steel Decking | | | 0.08 | | 0.08 | | |
| 4. Concrete Topping Slab | | | 0.12 | | 0.12 | | |
| 5. Rigid Insulation | | | | 0.21 | 0.21 | | |
| 6. Composition Roofing/Gravel | | | | 0.30 | 0.30 | | |
| 7. Sheetmetal Flashing/Coping | | | | 0.14 | 0.14 | | |
| 8. Concrete Slab and Beams | | | 2.10 | | 2.10 | | |
| 9. Keene's Cem. Clng. Finish | | 0.01 | | | 0.01 | H | H |
| 10. Clng. Paint on Concrete | | | 0.10 | | 0.10 | | H |
| 11. Hung ML & Plaster Ceiling | | | 0.18 | | 0.18 | | L |
| 12. Ac. Tile Ceiling | | | 0.07 | | 0.07 | | L |
| 13. Penthouse Walls (not shown) | | | | 0.10 | 0.10 | | |
| 14. Roof Monitors (not shown) | 0.04 | | | | 0.04 | | |
| | 0.04 | 0.01 | 2.92 | 0.75 | 3.72 | | |

Installed Cost Including Overhead & Profit $126,460 @ $4.30/square foot

RESIDENCE HALL NO. 4, HEDRICK, LOS ANGELES



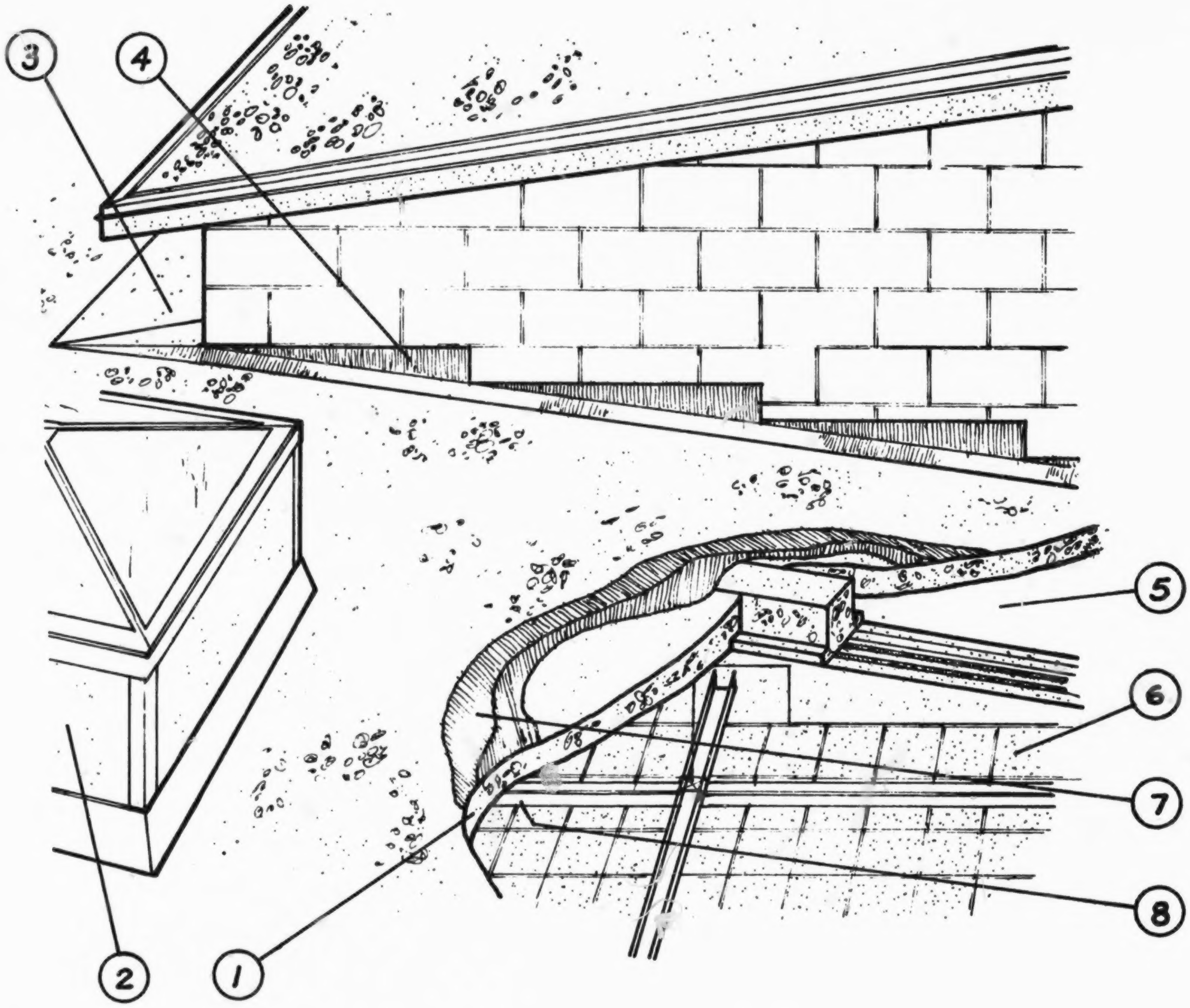
ROOF SYSTEM 17,400 sq.ft. = $62,930

C - Ratio (Component in Square Feet/OGSF = 0.25

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Roof Hatch and Screens | | | 0.04 | 0.04 | | |
| 2. Roofing | | | 0.30 | 0.30 | L | |
| 3. Sheetmetal | | | 0.16 | 0.16 | | |
| 4. Insulation | | | 0.30 | 0.30 | | |
| 5. Concrete Lift Slab | | 2.36 | | 2.36 | | |
| 6. Metal Lath and Plaster | 0.14 | | | 0.14 | L | L |
| 7. Paint Hung Ceiling | 0.04 | | | 0.04 | L | L |
| 8. Suspended Acoustic Tile | | 0.19 | | 0.19 | L | H |
| 9. Paint Exposed Ceiling | | 0.09 | | 0.09 | L | H |
| | 0.18 | 2.64 | 0.80 | 3.62 | | |

Installed Cost Including Overhead & Profit $72,684 @ $4.18/Square foot

RESIDENCE HALL NO. 4, LOTHIAN, RIVERSIDE



ROOF SYSTEM 28,188 square feet = $79,013
C - Ratio (Component in Square Feet/OGSF)

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Precast Concrete Slab & Beams | | 1.85 | | $1.85 | | |
| 2. Skylight | | | .02 | 0.02 | | |
| 3. Poured-in place Concrete | | .19 | | 0.19 | | |
| 4. Flashing | | | .27 | 0.27 | | |
| 5. Paint on Concrete | .01 | .07 | | 0.08 | | L |
| 6. Hung Plaster Ceiling | .02 | | | 0.02 | | |
| 7. Roofing and Insulation | | | .35 | 0.35 | | L |
| 8. Sandblasted Concrete | | .02 | | 0.02 | | |
| | .03 | 2.13 | .64 | $2.80 | | |

Installed Cost Including Overhead & Profit $91,260 @ $3.24/square foot

RESIDENCE HALL NO. 1, REVELLE, SAN DIEGO

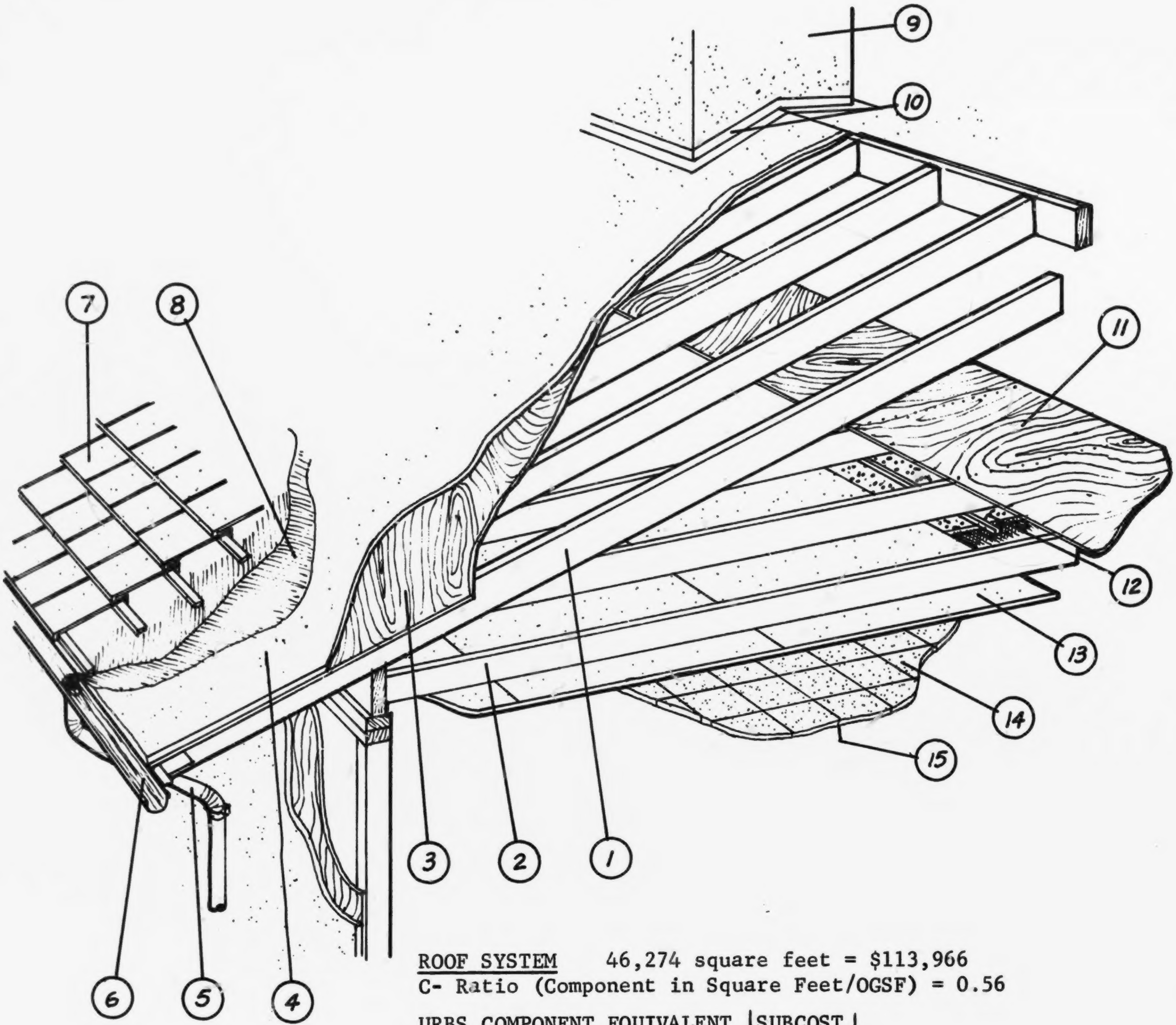
## ROOF SYSTEM CATEGORY COSTS (TYPE III - V BUILDINGS)

| | CONSTRUCTION COST | | | URBS COMPONENT EQUIVALENT per O.G.S.F. | |
|---|---|---|---|---|---|
| | Per sq. ft. of component | Per Resident | Per OGSF | Structure-ceiling | Bathrooms |
| Regan Hall<br>DAVIS | ($2.84) | $313 | ($1.58) | $0.81<br>51% | $0.03<br>2% |
| Mesa Court<br>IRVINE | $2.54 | ($355) | $1.74 | $0.87<br>50% | $0.04<br>2% |
| Cowell College<br>SANTA CRUZ | $2.75 | $233 | $1.02 | $0.36<br>35% | $0.02 |
| Crown College<br>SANTA CRUZ | $3.59 | $231 | $1.05 | $0.27<br>26% | $0.04<br>4% |
| Anacapa Hall<br>SANTA BARBARA | $4.39* | $571* | $3.19* | $1.85<br>58% | $0.10<br>3% |

* High ( ) Median ______ Low

The roofs of the Type III-V buildings are all sloping with finish materials providing architectural character. The most expensive roof is the interlocking tile on concrete slab at Anacapa Hall. This also contains the largest URBS equivalent structure. The Bermuda type roof on wood frame at Mesa Court is the least expensive roof in unit cost, but Regan Hall has a lower C-ratio so that it is least expensive per O.G.S.F.

Severe maintenance problems have been encountered at Regan Hall as the concrete roof tile used is no longer manufactured.

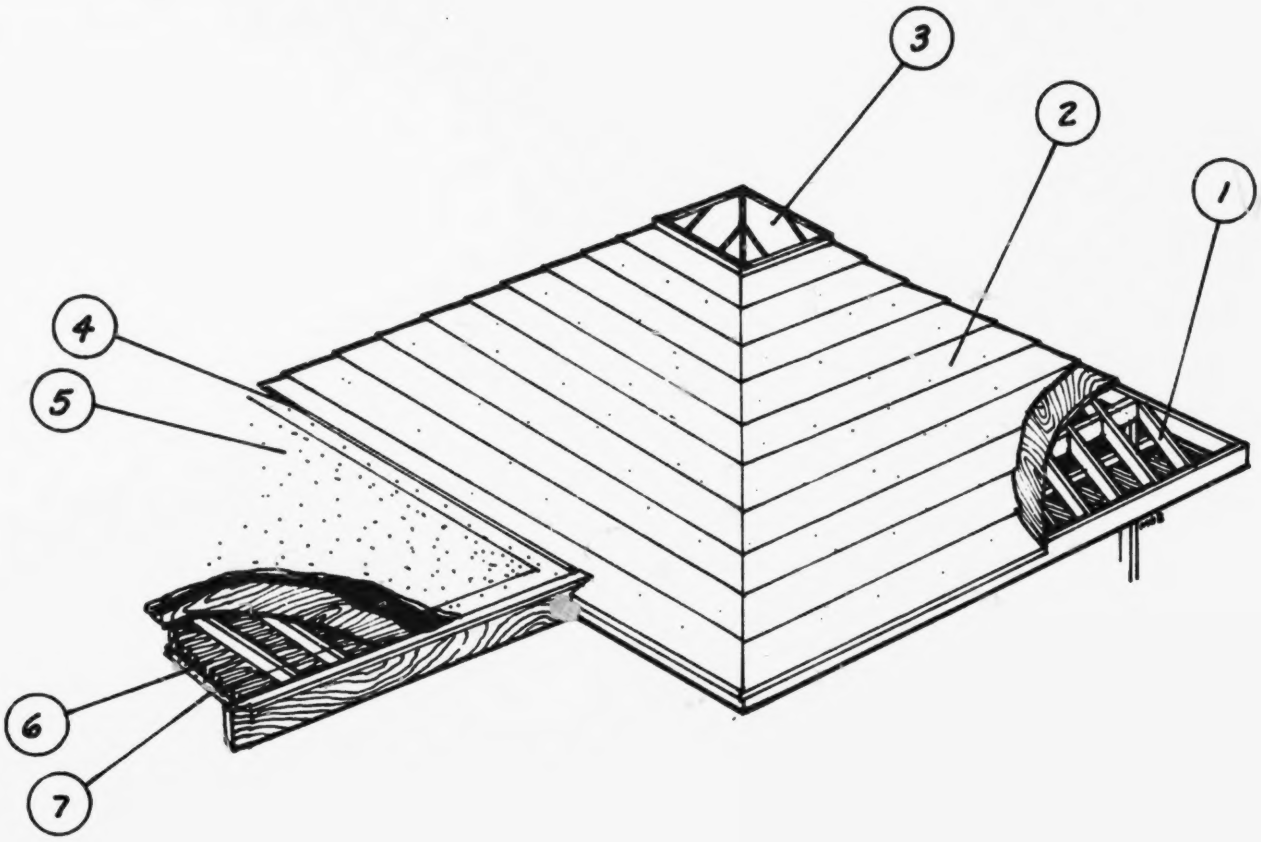


ROOF SYSTEM 46,274 square feet = $113,966
C- Ratio (Component in Square Feet/OGSF) = 0.56

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Str.-Ceil. | N. S. | | Cust. | Maint. |
| 1. Rafter Framing | | 0.43 | | 0.43 | | |
| 2. Ceiling Joists | | 0.26 | | 0.26 | | |
| 3. Plywood Sheathing | | 0.38 | | 0.38 | | |
| 4. Insulation w/Vapor Barrier | | | 0.11 | 0.11 | | |
| 5. R.W.L. (Downstairs) | | | 0.04 | 0.04 | | |
| 6. Gutter | | | 0.09 | 0.09 | L | |
| 7. Concrete Tile | | | 0.55 | 0.55 | L | H |
| 8. Felt Layers | | | 0.10 | 0.10 | | |
| 9. Monitor Enclosure | | | 0.05 | 0.05 | | |
| 10. Flashing | | | 0.01 | 0.01 | | |
| 11. Plywood Walkway | | 0.02 | | 0.02 | | |
| 12. Furred Gypsum Plaster | 0.04 | | | 0.04 | L | L |
| 13. Gypsum Board | | 0.20 | | 0.20 | L | H |
| 14. Acoustical Tile | | 0.05 | | 0.05 | | H |
| 15. Paint & Stain | 0.01 | 0.09 | | 0.10 | L | H |
| 16. Glu-Lam Beams (not shown) | | 0.03 | | 0.03 | | |
| | 0.05 | 1.46 | 0.95 | 2.46 | | |

Installed Cost Including Overhead & Profit $131,537 @ $2.84/square foot

RESIDENCE HALL NO. 6, REGAN, DAVIS

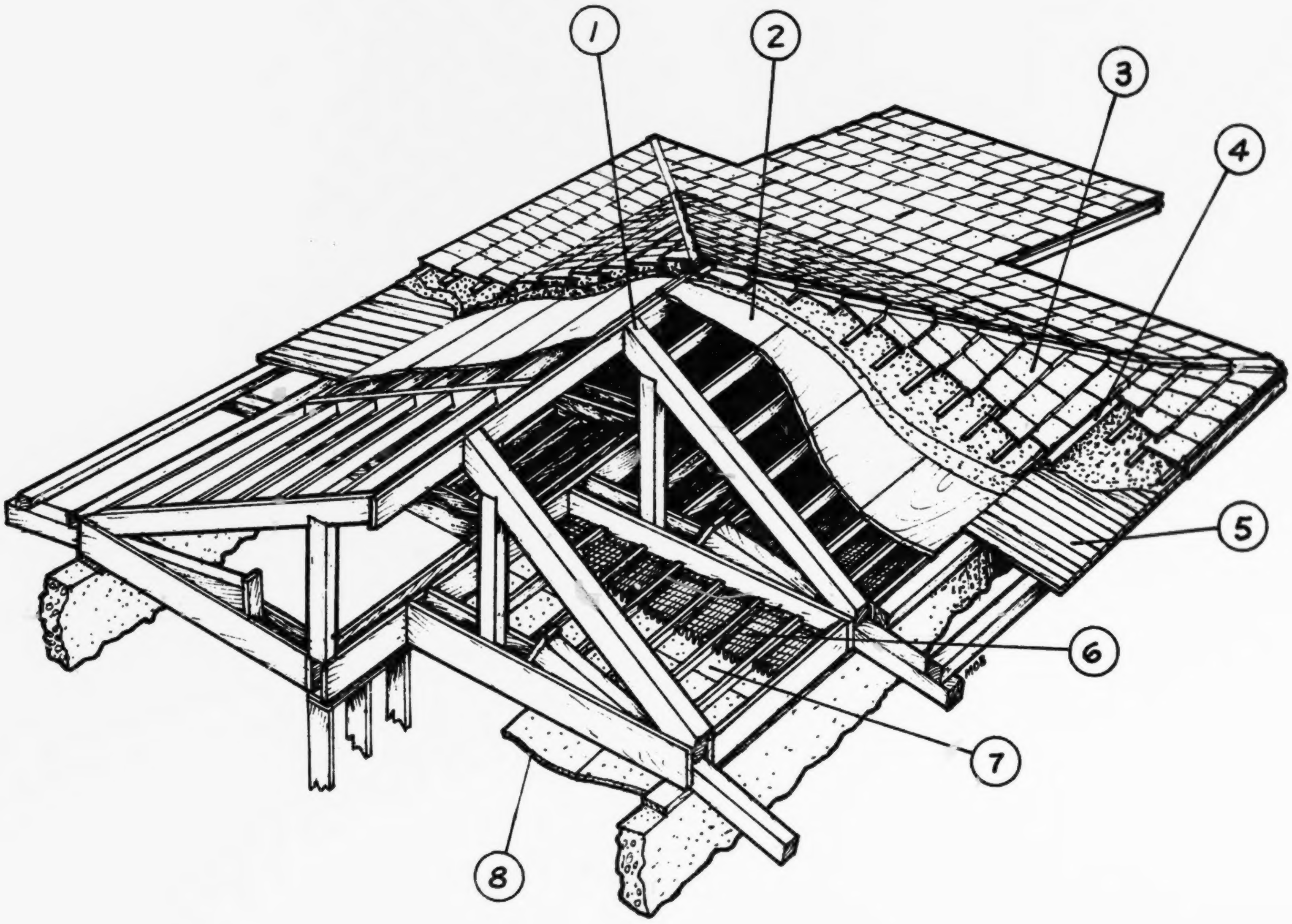


ROOF SYSTEM -57,000 sq. ft. = $ 125,570
C - Ratio (Component in Square Feet/OGSF) = 0.68

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | N. S. | | Cust. | Maint. |
| 1. Ceiling & Roof Framing | | .96 | | $ 0.96 | | |
| 2. Bermuda Roof | | | .40 | 0.40 | | |
| 3. Skylights | | | .07 | 0.07 | | L |
| 4. Sheet Metal | | | .05 | 0.05 | | |
| 5. Composition Roof | | | .22 | 0.22 | | L |
| 6. Thermal Insulation | | | .14 | 0.14 | | |
| 7. Plaster Ceiling | 0.04 | .32 | | 0.36 | | L |
| | 0.04 | 1.28 | .88 | $ 2.20 | | |

Installed Cost Including Overhead & Profit $145,033 @ $2.54/square feet

RESIDENCE HALL NO. 1, MESA COURT, IRVINE



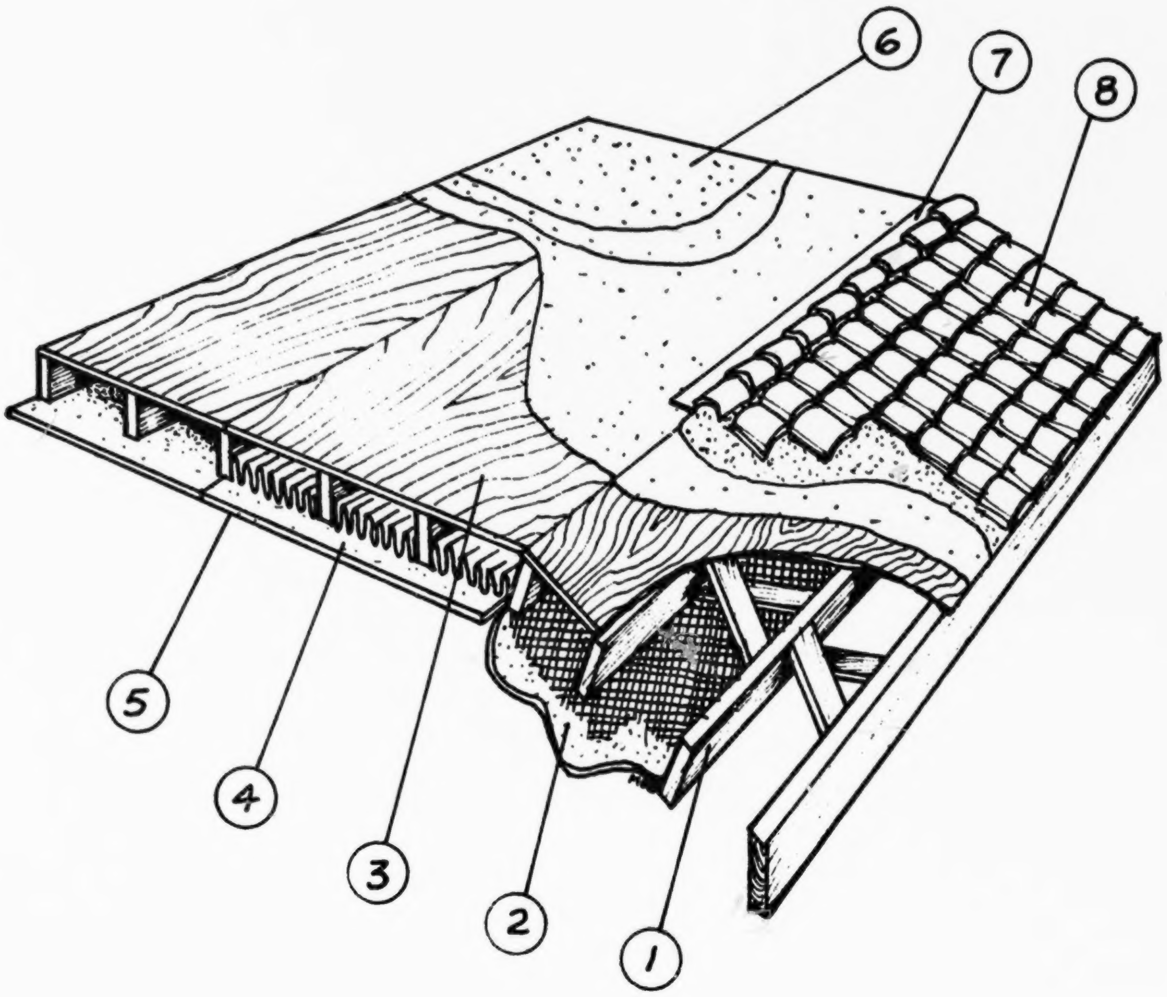
ROOF SYSTEM 35,200 square feet = $83,950

C - Ratio (Component in Square Feet/OGSF) = 0.37

| | | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | | Bath | Structure-Ceiling | N. S. | | Cust. | Maint. |
| 1. | Wood Framing | | 0.32 | | 0.32 | | |
| 2. | Plywood Sheathing | | 0.18 | | 0.18 | | |
| 3. | Clay Tile w/Waterproof Membrane | | | 1.14 | 0.14 | L | H |
| 4. | Copper Flashing | | | 0.15 | 0.15 | | |
| 5. | Wood Decking | | 0.22 | | 0.22 | | |
| 6. | Batt Insulation | | | 0.06 | 0.06 | | |
| 7. | Gypsum Board | | 0.17 | | 0.17 | L | L |
| 8. | Paint | 0.01 | 0.08 | | 0.09 | | L |
| 9. | Gypsum Plaster (not shown) | 0.02 | | | 0.02 | H | L |
| 10. | Ceramic Tile Ceiling (not shown) | 0.02 | | | 0.02 | H | H |
| | | 0.05 | 0.97 | 1.36 | 2.38 | | |

Installed Cost Including Overhead & Profit $96,940 @ $2.75/square foot

RESIDENCE HALL NO. 1, COWELL, SANTA CRUZ

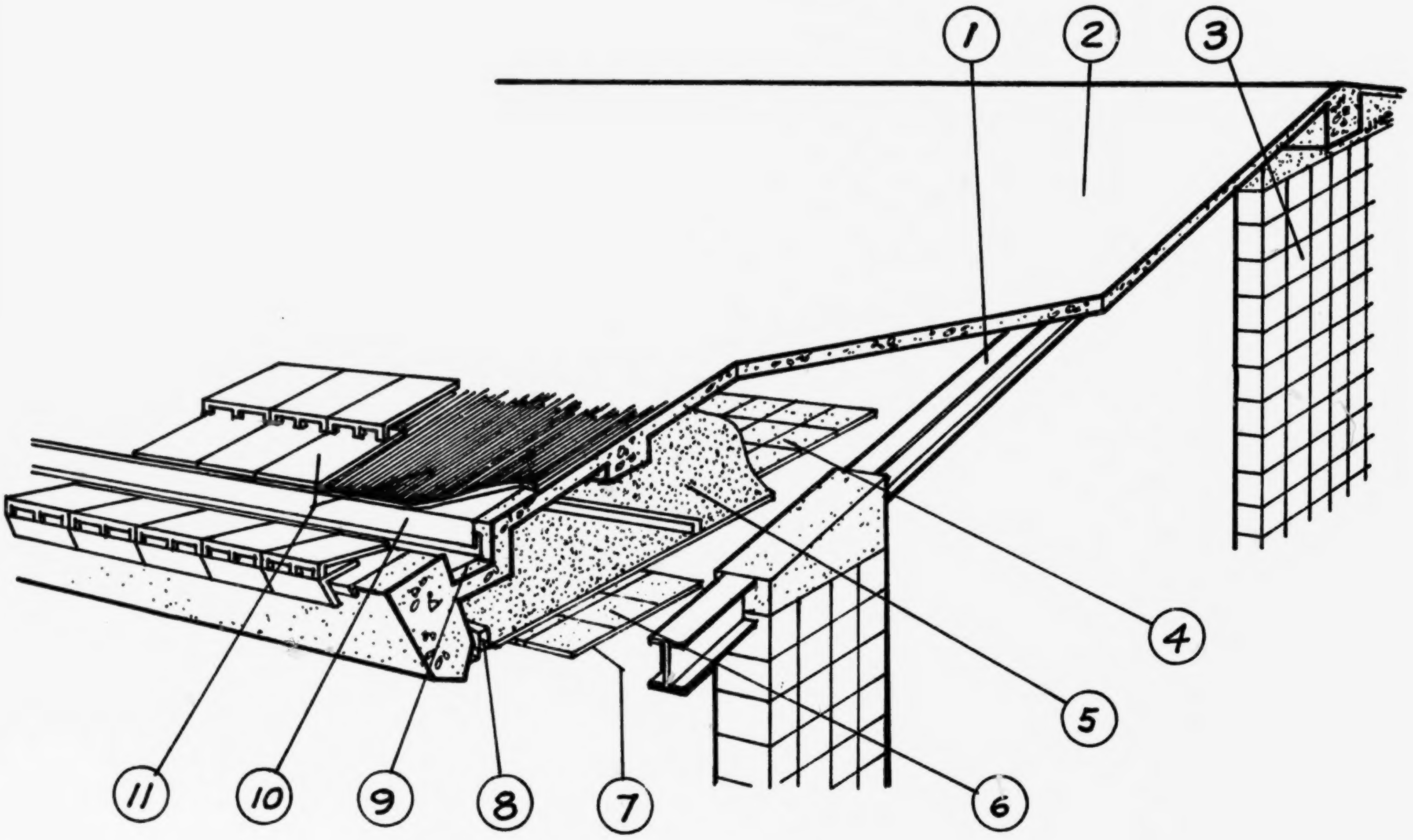


ROOF SYSTEM 25,720 sq. ft. = $79,930
C- Ratio (Component in Square Feet/OGSF) =

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | N. S. | | Cust. | Maint. |
| 1. Metal Lath & Plaster | 0.12 | | | 0.12 | | |
| 2. Gypsum Board | | 0.26 | | 0.26 | | |
| 3. Paint | 0.02 | 0.14 | | 0.16 | L | L |
| 4. Wood Framing | | 0.24 | | 0.24 | | |
| 5. Plywood Sheathing | | 0.27 | | 0.27 | | |
| 6. Composition Roofing | | | 0.01 | 0.01 | | |
| 7. Tile Roof w/membrane | | | 1.30 | 1.30 | | H |
| 8. Sheetmetal | | | 0.75 | 0.75 | | L |
| | 0.14 | 0.91 | 2.06 | 3.11 | | |

Installed Cost Including Overhead & Profit $ 92,319 @ $3.59/square foot

RESIDENCE HALL NO. 3, CROWN, SANTA CRUZ



ROOF SYSTEM 54,660 square feet = $207,550

C - Ratio (Component in Square Feet/OGSF =0.72

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. Steel Framing | | .12 | | $0.12 | | |
| 2. Concrete Slab | | 1.50 | | 1.50 | | |
| 3. Concrete Block Wall (Attic) | | .27 | | 0.27 | | |
| 4. Enamel Acoustic Tile | .03 | | | 0.03 | L | H |
| 5. Metal Lath and Plaster Ceiling | .05 | .50 | | 0.55 | | |
| 6. Acoustic Tile | | .11 | | 0.11 | | L |
| 7. Ceiling Paint | .08 | | | 0.08 | L | H |
| 8. Eave Vent and Gutter | | | .08 | 0.08 | | |
| 9. Precast Concrete Fascia | | | .07 | 0.07 | | |
| 10. Flashing and Cant Strip | | | .04 | 0.04 | | |
| 11. Tile and Composition Roof | | | .83 | 0.83 | | L |
| 12. Skylight Dome (not shown) | | | .02 | 0.02 | | L |
| 13. Lighting Cove (not shown) | | | .02 | 0.01 | H | L |
| 14. Drapery Track (not shown) | | | .04 | 0.04 | H | L |
| 15. Wood Framing at Attic(not shown) | | .04 | | 0.04 | | |
| | .16 | 2.54 | 1.10 | 3.80 | | |

Installed Cost Including Overhead & Profit $239,720 @ $4.39/sq. ft.

RESIDENCE HALL NO. 2, ANACAPA, SANTA BARBARA

## INTERIOR PARTITIONS COMPONENT COSTS (TYPE I BUILDINGS)

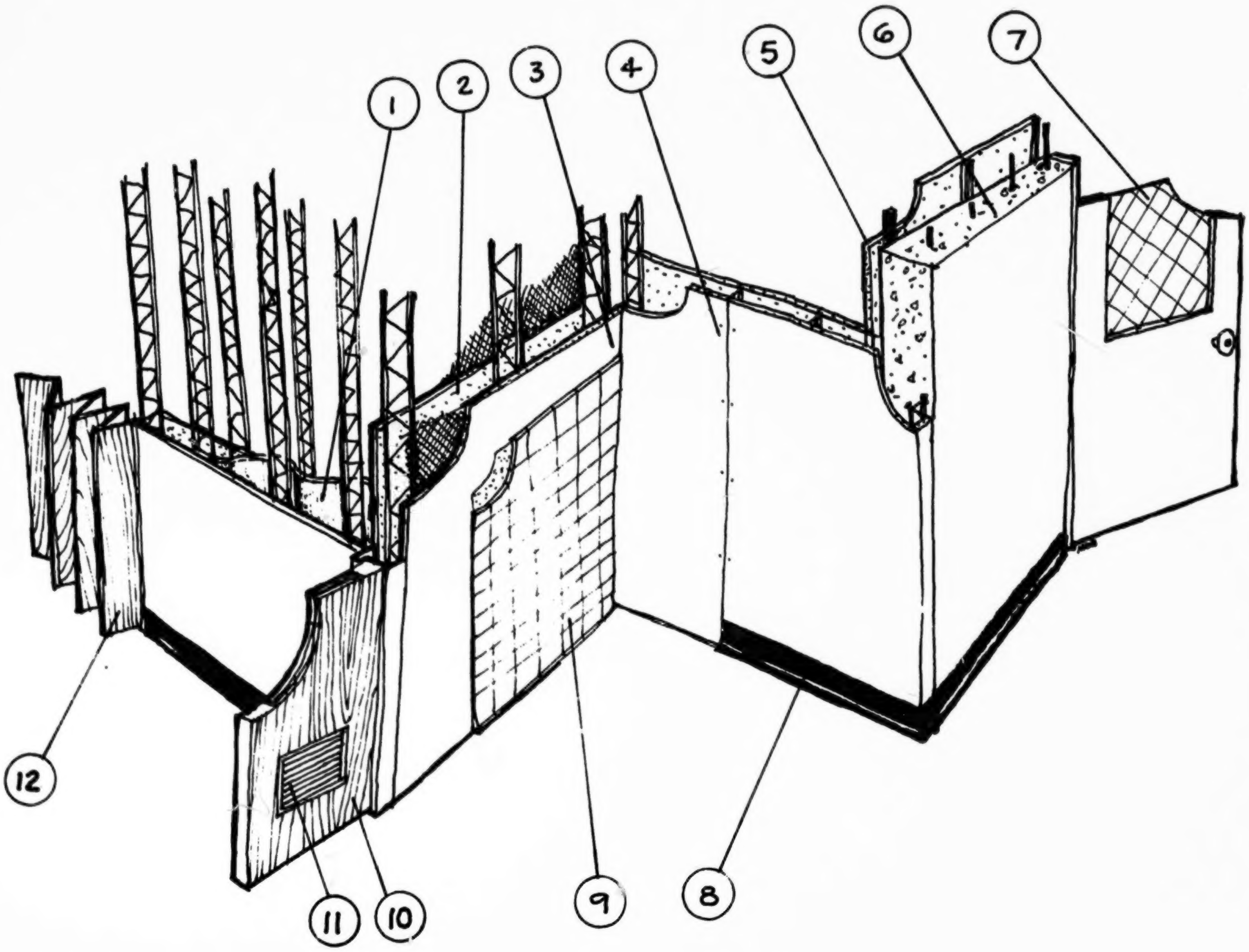
| | CONSTRUCTION COST | | | URBS COMPONENT EQUIVALENT per O.G.S.F. | | |
|---|---|---|---|---|---|---|
| | Per sq. ft. of Component | Per Resident | Per OGSF | Struct-ceiling | Partitions | Bathrooms |
| Priestly Hall<br>BERKELEY | ($3.24) | ($695) | ($3.73) | $0.30<br>8% | $2.29<br>61% | $0.68<br>18% |
| Ryerson Hall<br>DAVIS | $4.39* | $958* | $4.34* | $0.59<br>14% | $2.68<br>62% | $0.48<br>11% |
| Hedrick Hall<br>LOS ANGELES | $4.19 | $841 | $4.23 | $0.41<br>10% | $3.03<br>72% | $0.19<br>4% |
| Lothian Hall<br>RIVERSIDE | $2.87 | $541 | $3.27 | $0.24<br>7% | $1.88<br>57% | $0.72<br>22% |
| Revelle Hall<br>SAN DIEGO | $3.06 | $516 | $2.77 | $0.78<br>28% | $1.34<br>48% | $0.28<br>10% |

* High ( ) Median ____ Low

Permanent interior partitions in Type I buildings must be of incombustible materials with a minimum fire rating of 1-hour.

The high costs of partitions at Ryerson Hall results from the interior core being entirely surrounded by poured concrete bearing walls. In allocating this cost to the equivalent URBS component only one-half of their cost was considered as applicable. Note that the concrete block partitions at Revelle Hall result in relatively low unit price. The median prices at Priestly Hall represent dry-wall construction on metal studs.

Heaviest custodial effort is required for ceramic wall tile and terrazzo surfaces in bathrooms. Heaviest sources of maintenance costs are hardware and painted surfaces and doors. In several cases it has been necessary to remove and replace portions of basic partitions, often with ceramic tile, to locate water leaks. Rarely is any provision made for access without major expense.

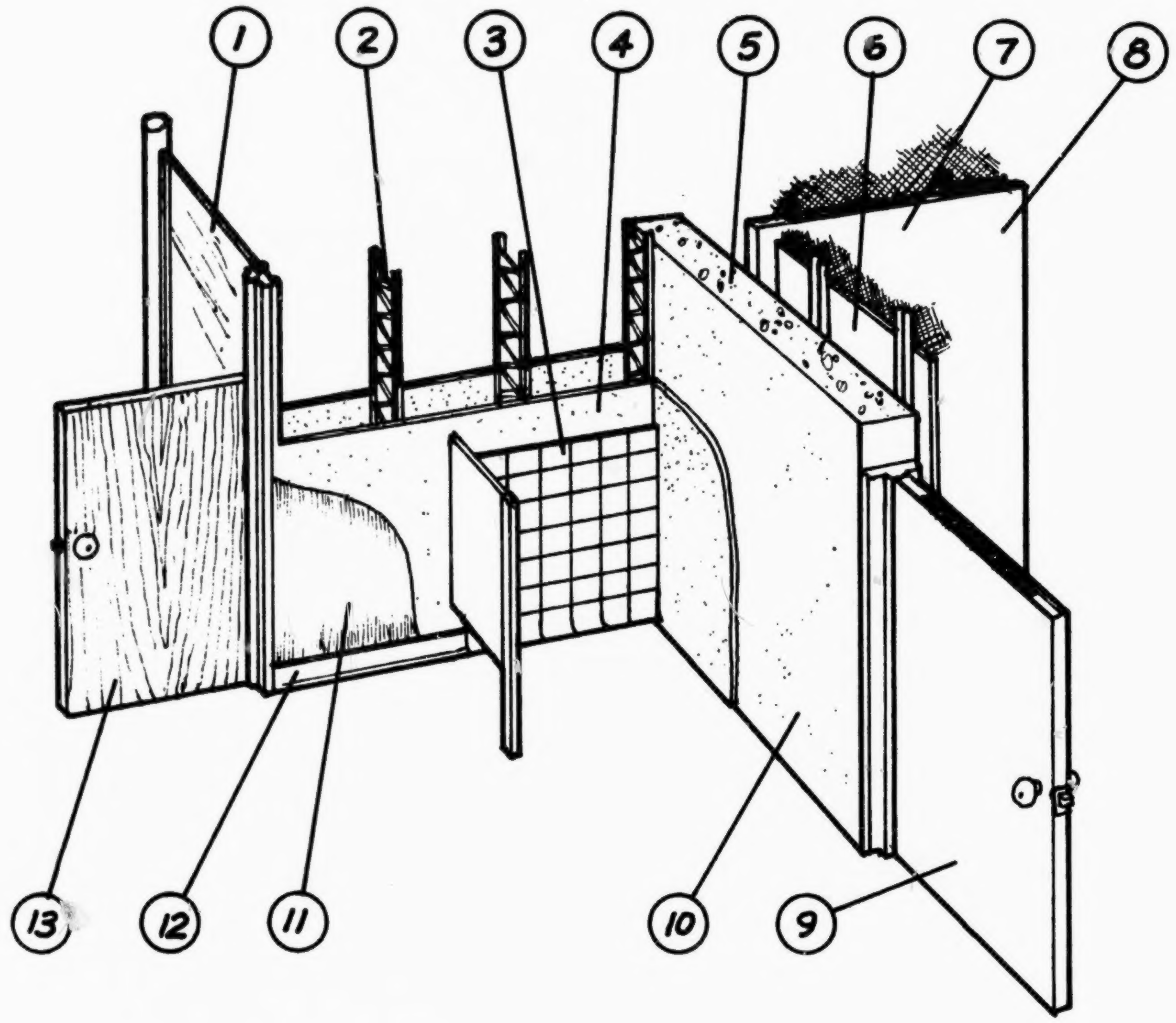


INTERIOR PARTITIONS 46,000 square feet = $128,850
C - Ratio (Component in Square Feet/OGSF) = 1.15

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Structure-Ceiling | Part. | Non-System | | Cust. | Maint. |
| 1. Sound Insulating Partitions | | | 0.05 | | 0.05 | | |
| 2. Metal Lath and Plaster | | | 0.16 | | 0.16 | | |
| 3. Enamel Paint | | | 0.27 | | 0.27 | L | H |
| 4. Metal Studs with Gypsumboard | | | 0.55 | | 0.55 | | |
| 5. Gypsum Furring | 0.11 | | | | 0.11 | | |
| 6. 8" Concrete Wall | | | 0.27 | | 0.53 | | |
| 7. Fire-Rated Doors | | | 0.14 | | 0.14 | L | L |
| 8. Rubber Base | | | 0.10 | | 0.10 | L | L |
| 9. Ceramic Wall Tile | 0.48 | | | | 0.48 | H | |
| 10. Wood Doors with Metal Frames | | | 0.38 | | 0.38 | H | H |
| 11. Louvered Doors | | | 0.06 | | 0.06 | L | L |
| 12. Sliding and Accordian Partitions | | | 0.01 | | | L | H |
| | 0.59 | | 1.99 | 0.00 | 2.84 | | |

Installed Cost Including Overhead & Profit $148,820 @ $3.24/square foot

RESIDENCE HALL NO. 3, PRIESTLY, BERKELEY

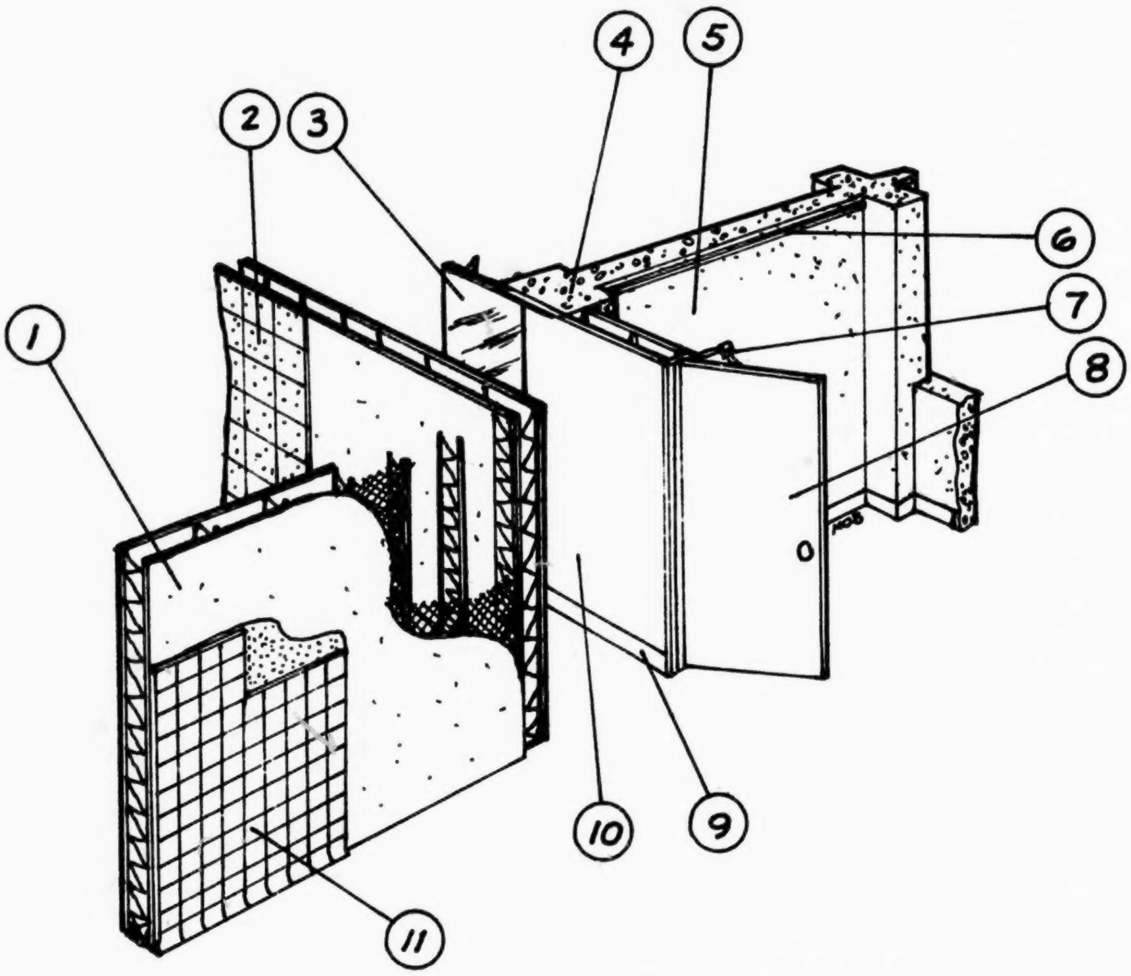


INTERIOR PARTITIONS 45,500 square feet = $169,120

C - Ratio (Component in Square Feet/OGSF= 0.99

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Part. | Struc-Ceiling | Non-System | | Cust. | Maint. |
| 1. Tubular Metal and Glass Partitions | | .09 | | | $0.09 | H | L |
| 2. Metal Studs and Plaster | | .09 | | | 0.09 | | |
| 3. Ceramic Wall Tile | .35 | | | | 0.35 | H | |
| 4. Stipple Paint on Plaster | | .06 | | | 0.06 | L | H |
| 5. Concrete Walls | | .60 | .60 | | 1.20 | | |
| 6. Furred Plaster | .14 | | | | 0.14 | | |
| 7. 2" Solid Plaster Partitions | | .55 | | | 0.55 | | |
| 8. Washable Paint on Plaster | | .28 | | | 0.28 | H | H |
| 9. Hollow Metal Doors | | .32 | | | 0.32 | L | H |
| 10. Stipple Paint on Concrete | | .12 | | | 0.12 | L | H |
| 11. Vinyl Wall Covering | | .10 | | | 0.10 | L | H |
| 12. Rubber Base | | .10 | | | 0.10 | L | L |
| 13. Wood Doors, Metal Frames | | .40 | | | 0.40 | H | H |
| | .49 | 2.71 | 0.60 | 0.00 | 3.80 | | |

Installed Cost Including Overhead & Profit $195,334 @ $4.39/sq.ft.

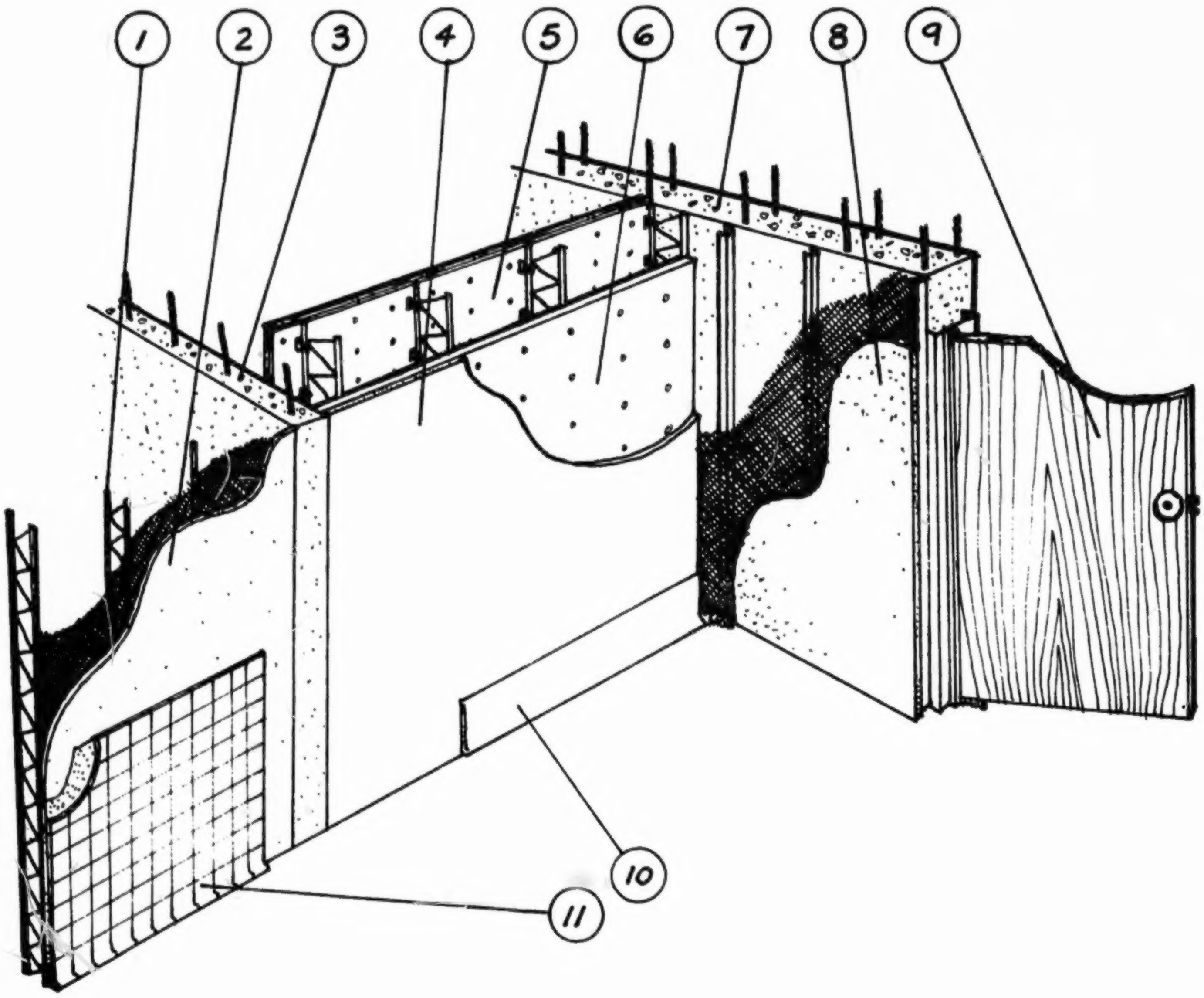


INTERIOR PARTITIONS 167,520 square feet = $608,460
C - Ratio (Component in Square Feet/OGSF) = 1.01

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Struc-Ceiling | Part. | Non-System | | Cust. | Maint. |
| 1. Metal Studs, Lath and Plaster Partitions | | | 2.15 | | 2.15 | | |
| 2. Acoustic Tile Finish | | | | 0.02 | 0.02 | | H |
| 3. Laminated Plastic Finish | | | 0.06 | | 0.06 | L | |
| 4. Concrete Columns | | 0.13 | | | 0.13 | | |
| 5. Concrete Walls | | 0.27 | | | 0.27 | | |
| 6. Picture-Hanging Rail | | | 0.06 | | 0.06 | | |
| 7. Door Closer | | | 0.06 | | 0.06 | | L |
| 8. Doors and Frames | | | 0.41 | | 0.41 | | L |
| 9. Rubber Base | | | 0.06 | | 0.06 | L | L |
| 10. Paint | | | 0.15 | | 0.15 | H | H |
| 11. Ceramic Tile Finish | 0.19 | | | | 0.19 | H | L |
| 12. Glass Partitions | | | 0.04 | | 0.04 | H | L |
| 13. Sliding Wood Doors | | | | 0.01 | 0.01 | | L |
| 14. Steel Columns | | 0.01 | | | 0.01 | | |
| 15. Vinyl Wall Covering | | | 0.01 | | 0.01 | L | L |
| | 0.19 | 0.41 | 3.00 | 0.03 | 3.63 | | |

Installed Cost Including Overhead and Profit $702,770 @ $4.19/square foot.

RESIDENCE HALL NO. 4, HEDRICK, LOS ANGELES



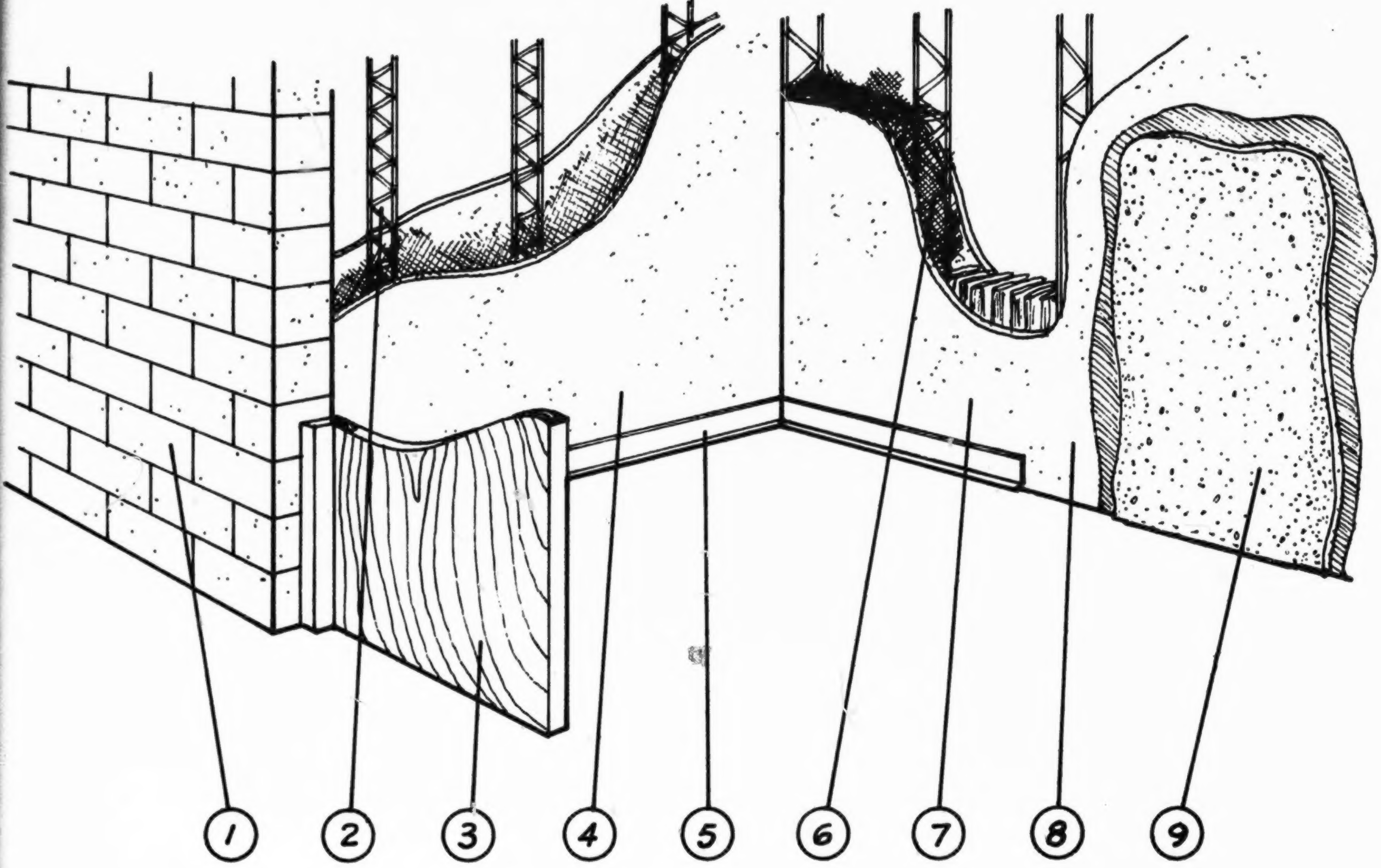
INTERIOR PARTITIONS 79,360 square feet = $197,520

C - Ratio (Component in Square Feet/OGSF)= 1.14

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Part. | Struc-Ceiling | | Cust. | Maint. |
| 1. Metal Studs | | .18 | | $0.18 | | |
| 2. Metal Lath/Cem. Plaster | .10 | .11 | | 0.21 | | |
| 3. 6" Concrete Walls | | .10 | .11 | 0.21 | | |
| 4. Paint - Allkyd Enamel | | .26 | | 0.26 | L | H |
| 5. Gypsum Lath and Plaster on Resil. Clips | | .12 | | 0.12 | | |
| 6. Gypsum Lath and Plaster | | .20 | | 0.20 | | |
| 7. 10" Concrete Walls | | .11 | .10 | 0.21 | | |
| 8. Metal Lath and Plaster Furring | .05 | | | 0.05 | | |
| 9. Solid Core Wood Doors | | .47 | | 0.47 | H | H |
| 10. Resilient Base | | .10 | | 0.10 | L | L |
| 11. Ceramic Wall Tile | .48 | | | 0.48 | H | |
| | .63 | 1.65 | .21 | 2.49 | | |

Installed Cost Including Overhead and Profit $228,136 @ $2.87/square foot

RESIDENCE HALL NO. 4, LOTHIAN, RIVERSIDE



INTERIOR PARTITIONS  74,570 square feet = $197,717
C - Ratio (Component in Square Feet/OGSF) = 0.91

| | | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Part. | Struct.-Ceiling | Non-System | | Cust. | Maint. |
| 1. 8" Concrete Block Wall | | 0.86 | 0.86 | | 1.72 | | |
| 2. 2-½" Metal Studs | | 0.04 | | | 0.04 | | |
| 3. Wood Doors& Hardware | | 0.28 | | | 0.28 | L | H |
| 4. Gypsum Plaster | | 0.16 | | | 0.16 | | |
| 5. Vinyl Base | | 0.03 | | | 0.03 | H | L |
| 6. 4" Metal Studs | | 0.06 | | | 0.06 | | |
| 7. Waterproof Plaster | 0.02 | | | | 0.02 | | |
| 8. Paint | 0.01 | 0.05 | | | 0.06 | L | L |
| 9. Terrazzo | 0.28 | | | | 0.28 | L | L |
| | 0.31 | 1.48 | 0.86 | 0.00 | 2.65 | | |

Installed Cost Including Overhead and Profit $228,363 @ $3.06/square foot.

RESIDENCE HALL NO. 1, REVELLE, SAN DIEGO

## INTERIOR PARTITION COMPONENT COSTS (TYPE III - V BUILDINGS)

| | CONSTRUCTION COST | | | URBS COMPONENT EQUIVALENT per O.G.S.F. | | |
|---|---|---|---|---|---|---|
| | Per sq. ft. of Component | Per Resident | Per OGSF | Structure-ceiling | Partition | Bathrooms |
| Regan Hall<br>DAVIS | ($2.52) | $455 | $2.30 | -0-<br>0% | $1.64<br>71% | $0.26<br>11% |
| Mesa Court<br>IRVINE | $2.35 | $406 | $1.98 | -0-<br>0% | $1.64<br>83% | $0.08<br>4% |
| Cowell College<br>SANTA CRUZ | $2.47 | $601 | ($2.64) | $0.15<br>6% | $1.64<br>62% | $[illegible]9<br>19% |
| Crown College<br>SANTA CRUZ | $3.67* | $633* | $2.88* | -0-<br>0% | $2.11<br>73% | $0.38<br>13% |
| Anacapa Hall<br>SANTA BARBARA | $2.80 | ($501) | $2.80 | $0.51<br>18% | $1.67<br>60% | $0.25<br>9% |

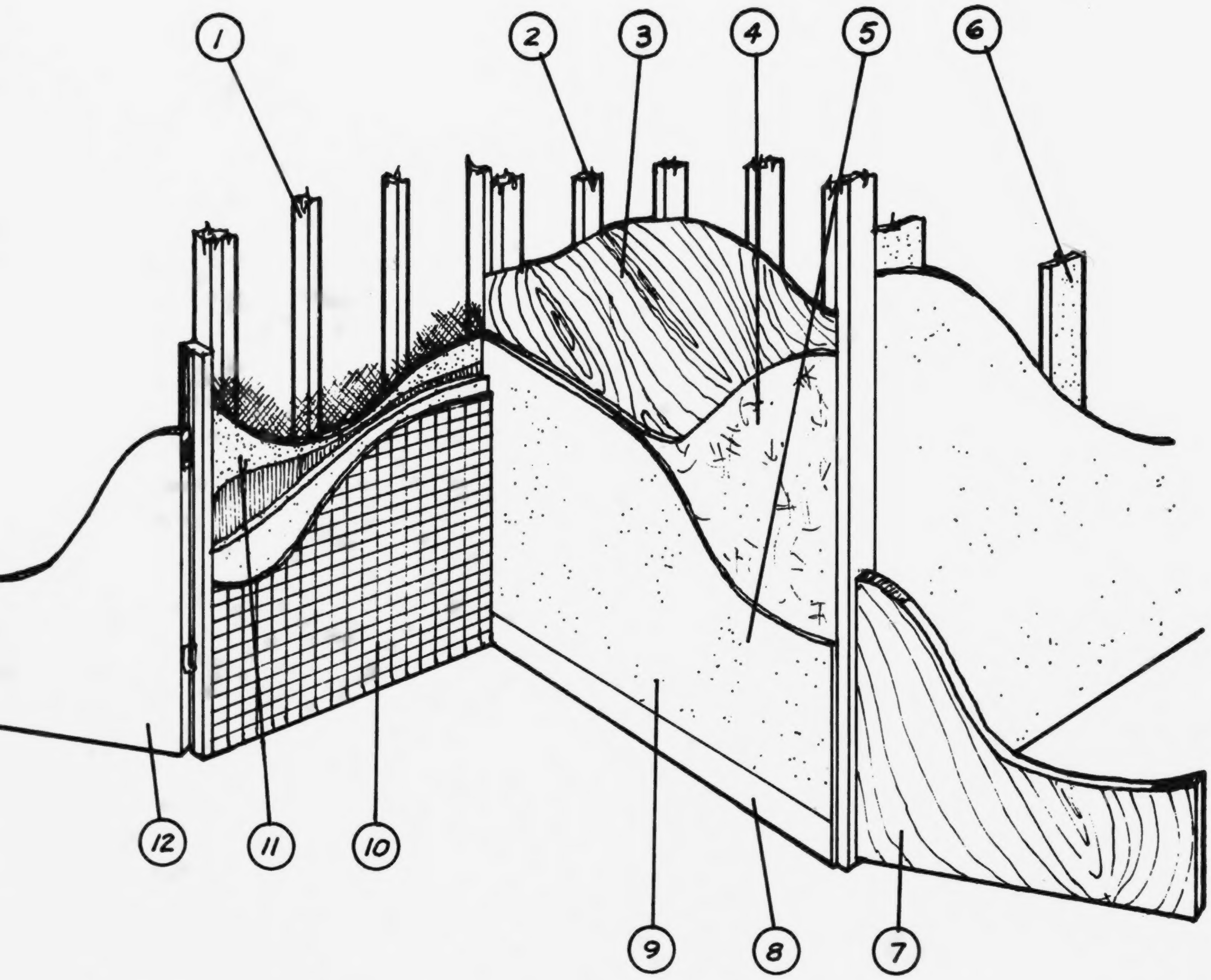
* High ( ) Median ____ Low

All of the Type III-V buildings studied are of such floor area that 1-hour rated partitions are required. They are not, however, required to be of incombustible construction as in Type I; therefore, wood studs are permissible.

The most elaborate partitions, at Crown College, consist of layers of plywood and gypsum board on wood studs. The least expensive, at Mesa Court, are unpainted interior stucco on gypsum lath with resilient clips and sound-deadening bats. In Type III-V building partitions the cost of doors appears proportionately higher than in the Type I buildings.

In calculating the equivalent costs of URBS partitions, wood stud interior walls--even though load-bearing in some instances--are considered doing the same task as the URBS partitions will provide. Concrete block partitions, as in Anacapa Hall, are considered partially structural.

Custodial and maintenance records indicate that the problem areas are similar to those in Type I construction; bathroom and painted surfaces require the most custodial care. The integrally finished stucco surface will soon require painting to cover the mars and stains, particularly adjacent to door frames, corners and windows.

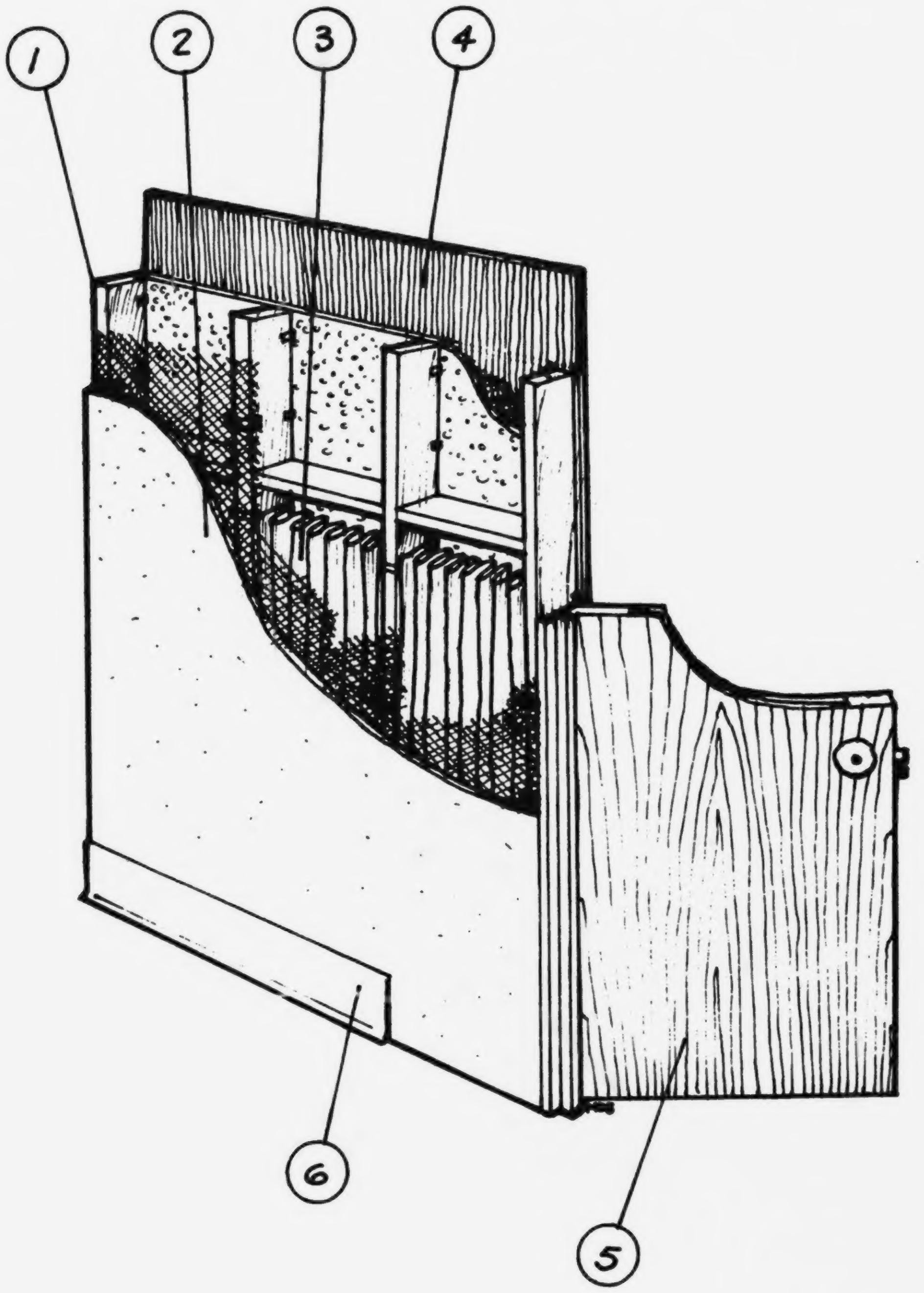


INTERIOR PARTITIONS 75,744 square feet = $165,460
C - Ratio (Component in Square Feet/OGSF) = 0.91

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Part. | Non-System | | Cust. | Maint. |
| 1. Hardwood Paneling | | 0.01 | | 0.01 | L | L |
| 2. Wood Framing | | 0.22 | | 0.22 | | |
| 3. Plywood Sheathing | | 0.02 | | 0.02 | | |
| 4. Fibre Board | | 0.02 | | 0.02 | | |
| 5. Gypsum Board | | 0.41 | | 0.41 | | |
| 6. Gypsum Rib Framing | | 0.06 | | 0.06 | | |
| 7. Wood Doors and Frames | | 0.55 | | 0.55 | L | H |
| 8. Rubber Base | | 0.09 | | 0.09 | L | L |
| 9. Paint | | 0.30 | | 0.30 | L | H |
| 10. Ceramic Tile Wainscot | 0.18 | | | 0.18 | H | |
| 11. Plaster on Gypsum Lath | 0.10 | | | 0.10 | | |
| 12. Metal Doors and Frames | | 0.18 | | 0.18 | L | L |
| 13. Acoustic Paneling (not shown) | | 0.04 | | 0.04 | L | H |
| | 0.28 | 1.80 | 0.00 | 2.18 | | |

Installed Cost Including Overhead and Profit $191,108 @ $2.52/square foot.

RESIDENCE HALL NO. 6, REGAN, DAVIS

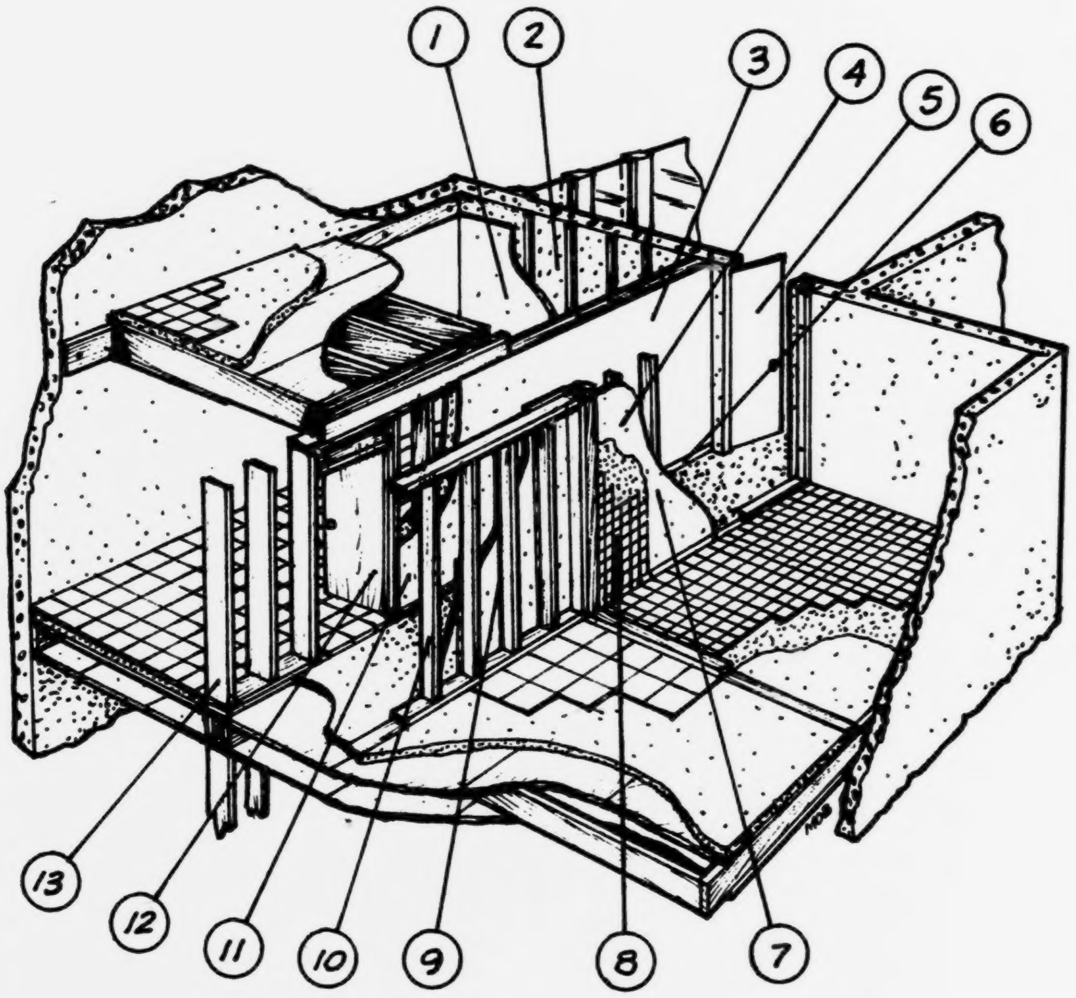


INTERIOR PARTITIONS 70,400 square feet = $143,400
C - Ratio (Component in Square Feet/OGSF = 0.84

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Part. | Non-System | | Cust. | Maint. |
| 1. Wood Framing | | .27 | | $0.27 | | |
| 2. Lath and Plaster on Resilient Clips | | .65 | | 0.65 | L | H |
| 3. Sound Insulation | | .11 | | 0.11 | | |
| 4. Hardboard Facing | .09 | | | 0.09 | H | H |
| 5. Wood Doors - Metal Frames | | .82 | | 0.82 | H | H |
| 6. Vinyl Base | | .09 | | 0.09 | L | L |
| | .09 | 1.94 | 0 | $2.03 | | |

Installed Cost Including Overhead & Profit $165,627 @ $2.35/square foot

RESIDENCE HALL NO. 1, MESA COURT, IRVINE

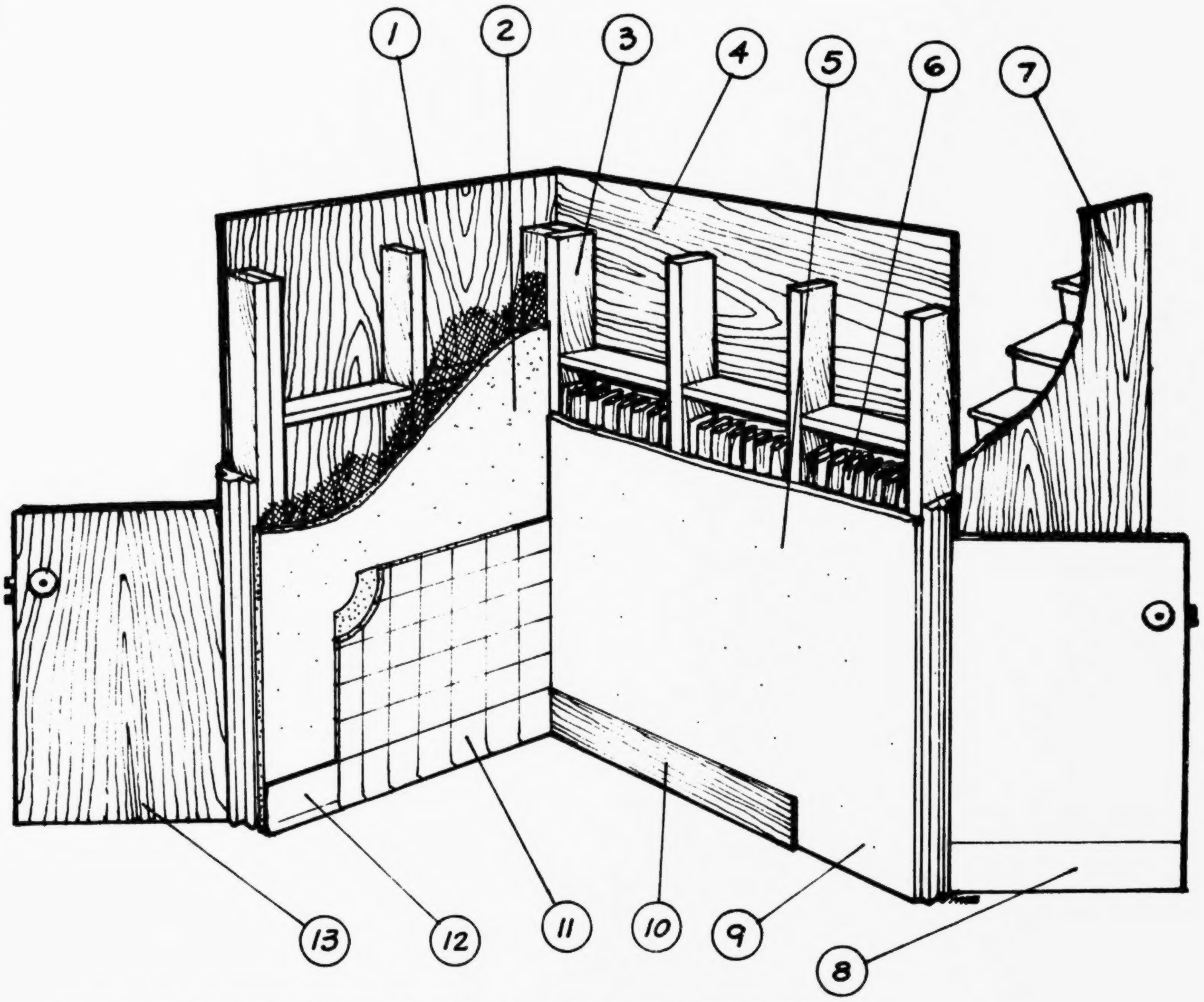


INTERIOR PARTITIONS 101,258 square feet = $216,335
C - Ratio (Component in Square Feet/OGSF) = 1.07

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Part. | Struc. Ceiling | Non-System | | Cust. | Maint. |
| 1. Gypsum Furring | | 0.03 | | | 0.03 | | |
| 2. 8" Concrete Wall | | 0.11 | 0.11 | | 0.22 | | |
| 3. Interior Paint | | 0.16 | | | 0.16 | L | H |
| 4. Enamel Paint | 0.05 | | | | 0.05 | H | H |
| 5. Metal Doors | | 0.16 | | | 0.15 | L | L |
| 6. Wood Base | | 0.08 | | | 0.08 | L | L |
| 7. Gypsum Plaster | 0.10 | | | | 0.10 | | |
| 8. Ceramic Tile | 0.31 | | | | 0.31 | H | |
| 9. Gypsum Board on Resilient Channels | | 0.01 | | | 0.01 | | |
| 10. 2x4 Framing | | 0.13 | | | 0.13 | | |
| 11. Gypsum Board | | 0.20 | | | 0.20 | | |
| 12. Solid Core Wood Doors | | 0.61 | | | 0.61 | L | L |
| 13. 2x6 Framing | | 0.06 | | | 0.06 | | |
| 14. Steel Columns | | | 0.03 | | 0.03 | | |
| | 0.46 | 1.54 | 0.14 | 0.00 | 2.14 | | |

Installed Cost Including Overhead & Profit $249,867 @ $2.47/square foot

RESIDENCE HALL NO. 1, COWELL, SANTA CRUZ

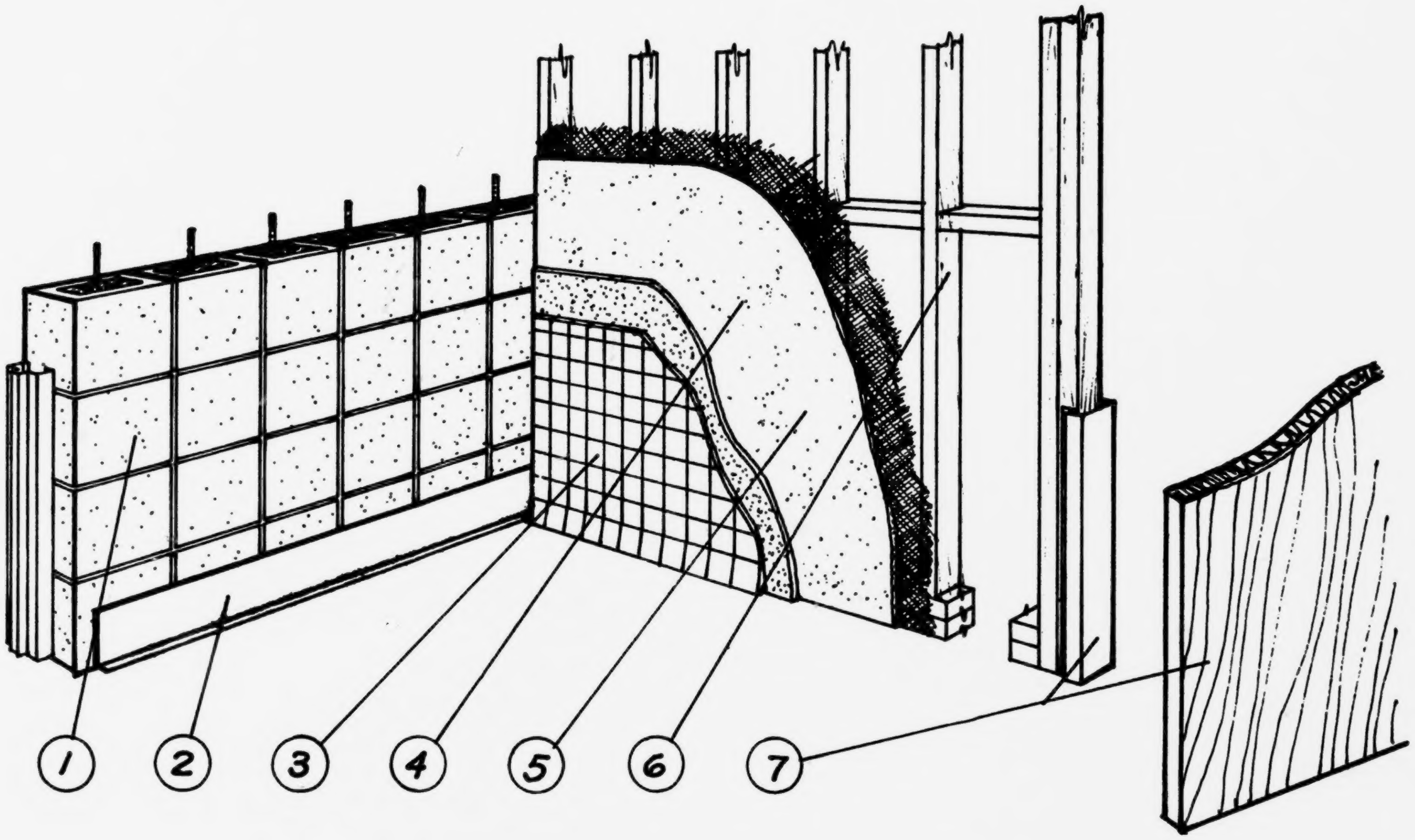


INTERIOR PARTITIONS 69,000 square feet = $219,130
C - Ratio (Component in Square Feet/OGSF) = 0.79

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Part. | Non-System | | Cust. | Maint. |
| 1. 3/8" Plywood Paneling | | .58 | | $0.58 | | L |
| 2. Metal Lath and Plaster | .14 | | | 0.14 | | |
| 3. Wood Framing | | .27 | | 0.27 | | |
| 4. 3/8" Plywood Structural Sheathing | | .40 | | 0.40 | | |
| 5. 5/8" Gypsum Board | | .34 | | 0.34 | | |
| 6. Sound Insulation | | .01 | | 0.01 | | |
| 7. Stain - Plywood Paneling | | .15 | | 0.15 | L | H |
| 8. 3'-0" Label Doors | | .23 | | 0.23 | L | L |
| 9. Painting | | .09 | | 0.09 | L | H |
| 10. Wood Base | | .07 | | 0.07 | L | L |
| 11. Ceramic Tile Walls | .34 | | | 0.34 | H | |
| 12. Resilient Base | | .01 | | 0.01 | L | L |
| 13. 2'-8" Wood Doors | | .55 | | 0.55 | L | H |
| | .48 | 2.70 | 0.00 | $3.18 | | |

Installed Cost Including Overhead and Profit $253,095 @ $3.67/square foot

RESIDENCE HALL NO. 3, CROWN, SANTA CRUZ



INTERIOR PARTITIONS 75,044 square feet = $182,110
C - Ratio (Component in Square Feet/OGSF) = 1.00

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Part. | Structure-Ceiling | Non-System | | Cust. | Maint. |
| 1. 8" Block Walls | | 0.51 | 0.51 | | 1.02 | L | |
| 2. Rubber Base | | 0.10 | | | 0.10 | L | H |
| 3. Ceramic Wall Tile | 0.18 | | | | 0.18 | H | |
| 4. Wall Plaster | 0.05 | 0.20 | | | 0.25 | | |
| 5. Paint and Sealant | 0.02 | | | | 0.28 | L | H |
| 6. Wood Studwalls | | 0.16 | | | 0.16 | | |
| 7. Interior Doors & Hardware | | 0.41 | | | 0.41 | L | L |
| 8. Wood Paneling (not shown) | | 0.02 | | | 0.02 | L | L |
| 9. Wood Base (not shown) | | 0.01 | | | 0.01 | L | L |
| | 0.25 | 1.67 | 0.51 | 00 | 2.43 | | |

Installed Cost Including Overhead and Profit $210,340 @ $2.80/square foot

RESIDENCE HALL NO. 2, ANACAPA, SANTA BARBARA

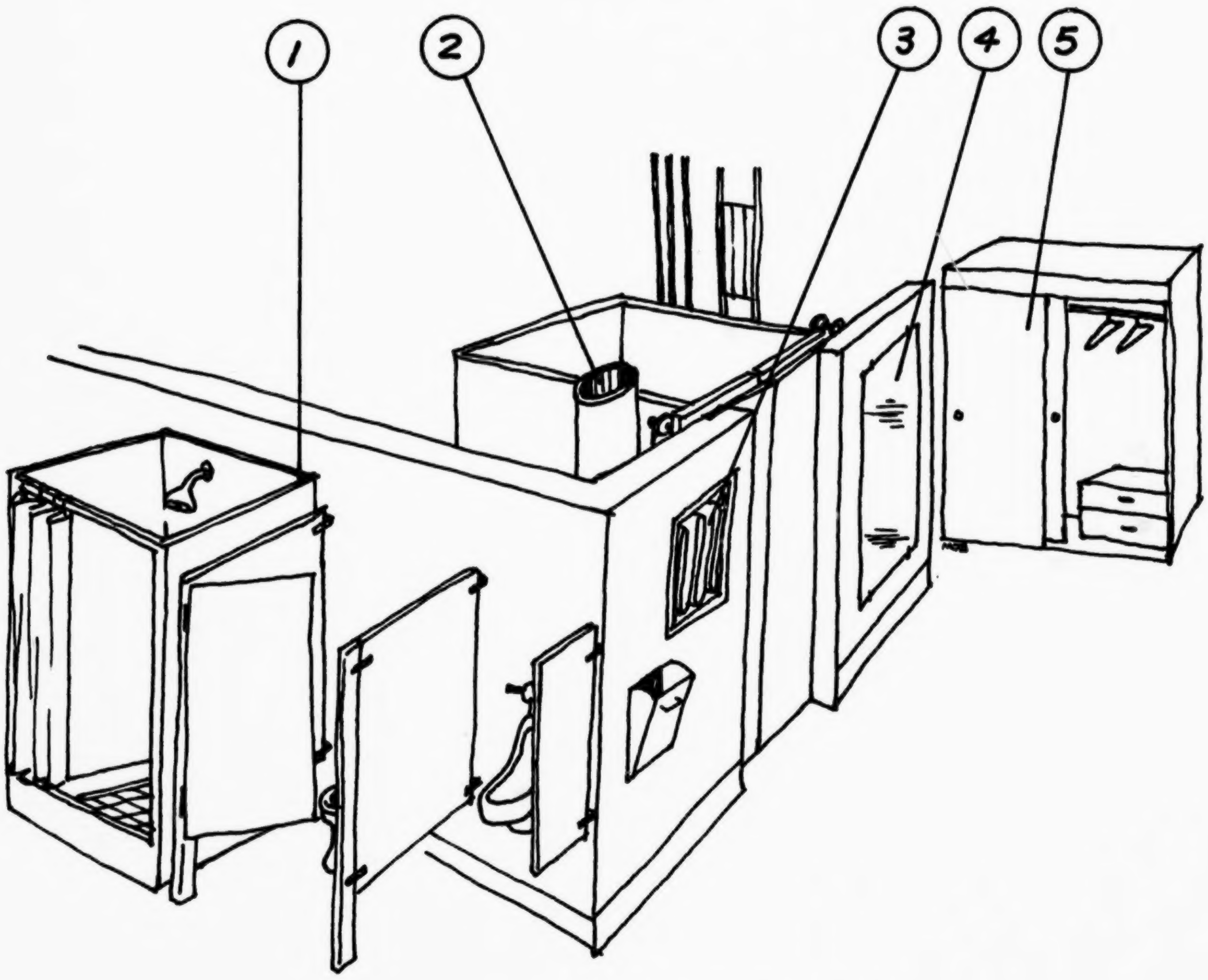
## INTERIOR GENERAL COMPONENT COSTS (TYPE I BUILDINGS)

| | CONSTRUCTION COST | | URBS COMPONENT EQUIVALENT per O.G.S.F. | | |
|---|---|---|---|---|---|
| | Per Resident | Per OGSF | Partitions | Bathrooms | Furnishings |
| Priestly Hall<br>BERKELEY | ($203) | ($1.09) | $0.03<br>3% | $0.10<br>9% | $0.75<br>69% |
| Ryerson Hall<br>DAVIS | $244 | $1.13 | $0.05<br>4% | $0.25<br>22% | $0.64<br>57% |
| Hedrick Hall<br>LOS ANGELES | $381 | $1.92 | $0.09<br>5% | $0.12<br>6% | $1.42<br>74% |
| Lothian Hall<br>RIVERSIDE | $1.39 | $0.84 | $0.02<br>2% | $0.06<br>7% | $0.67<br>80% |
| Revelle Hall<br>SAN DIEGO | $405* | $2.18* | - | $0.16<br>16% | $1.70<br>78% |

* High ( ) Median ____ Low

The costs of building construction for the General Interior component varies mainly with the number of residents served by a bathroom and the built-in storage and furnishings within the bed-study rooms. In the Type I buildings, Revelle Hall has one bath for every ten resident students and provides a wardrobe-desk-bookshelf-bed unit for each student. Lothian Hall has a bath for every 40 students and included only wardrobe facilities in its building construction contract. The desk-bed-file-bookshelf units built into Hedrick Hall are almost as elaborate as the Revelle units.

Practically all of the general interior elements require custodial care of some sort. Furnishings will rarely last twenty years without major refurbishing or replacement. Wardrobe doors, particularly the sliding type, have been a heavy source of maintenance cost.

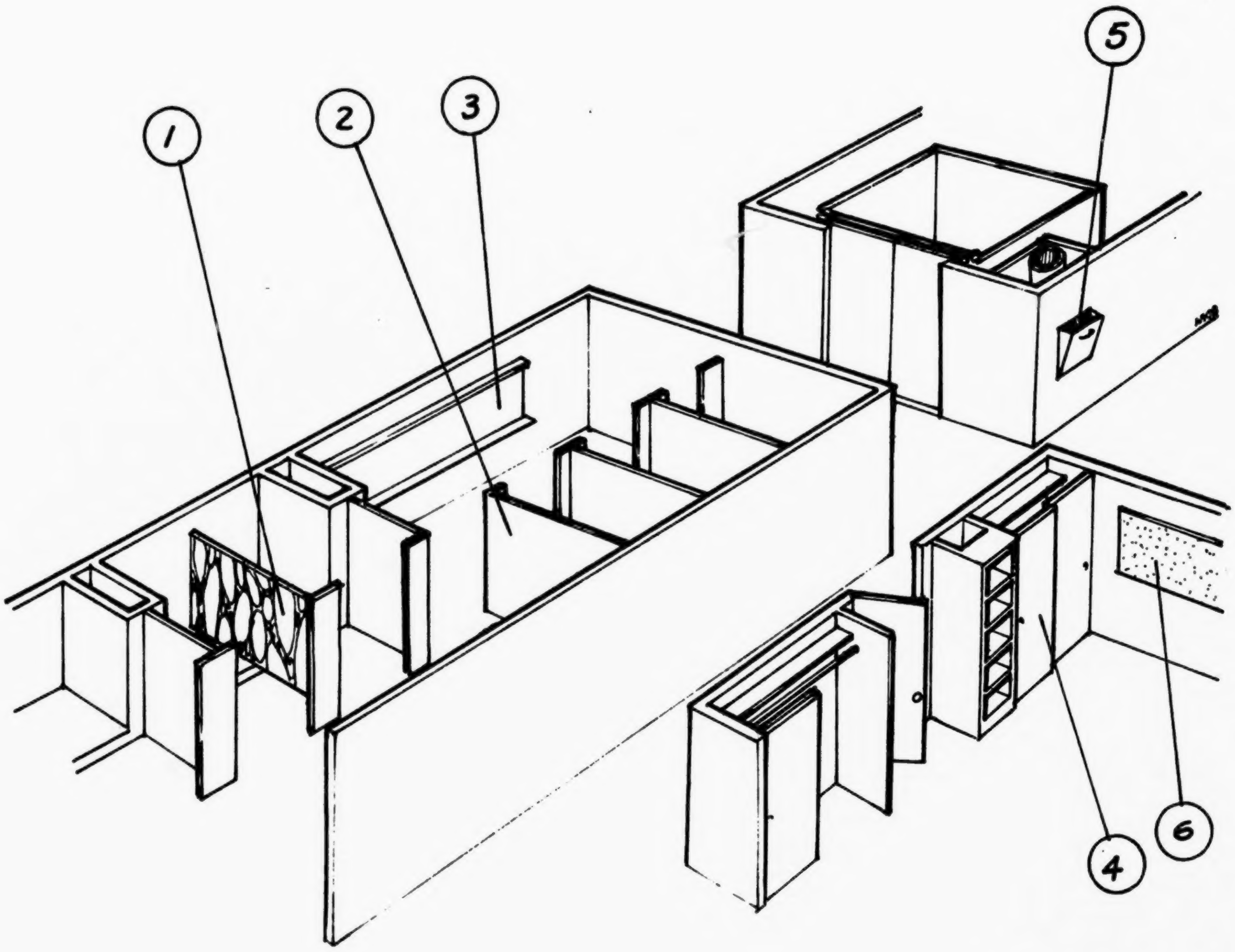


INTERIOR GENERAL 40,000 square feet = $ 37,700
(No C factor)

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Part | Bath | Furn | N. S. | | Cust. | Maint. |
| 1. Shower & Toilet Stalls | | 0.10 | | | 0.10 | H | L |
| 2. Trash & Laundry Chutes | | | | 0.05 | 0.05 | L | L |
| 3. Firehose Cabinets | | | | 0.02 | 0.02 | | |
| 4. Mirrors | 0.03 | | | | 0.03 | L | |
| 5. Wardrobe Cabinets | | | 0.75 | | 0.75 | L | H |
| | 0.03 | 0.10 | 0.75 | 0.07 | 0.95 | | |

Installed Cost Including Overhead & Profit $43,540 @ $1.09/square foot

RESIDENCE HALL NO. 3, PRIESTLY, BERKELEY

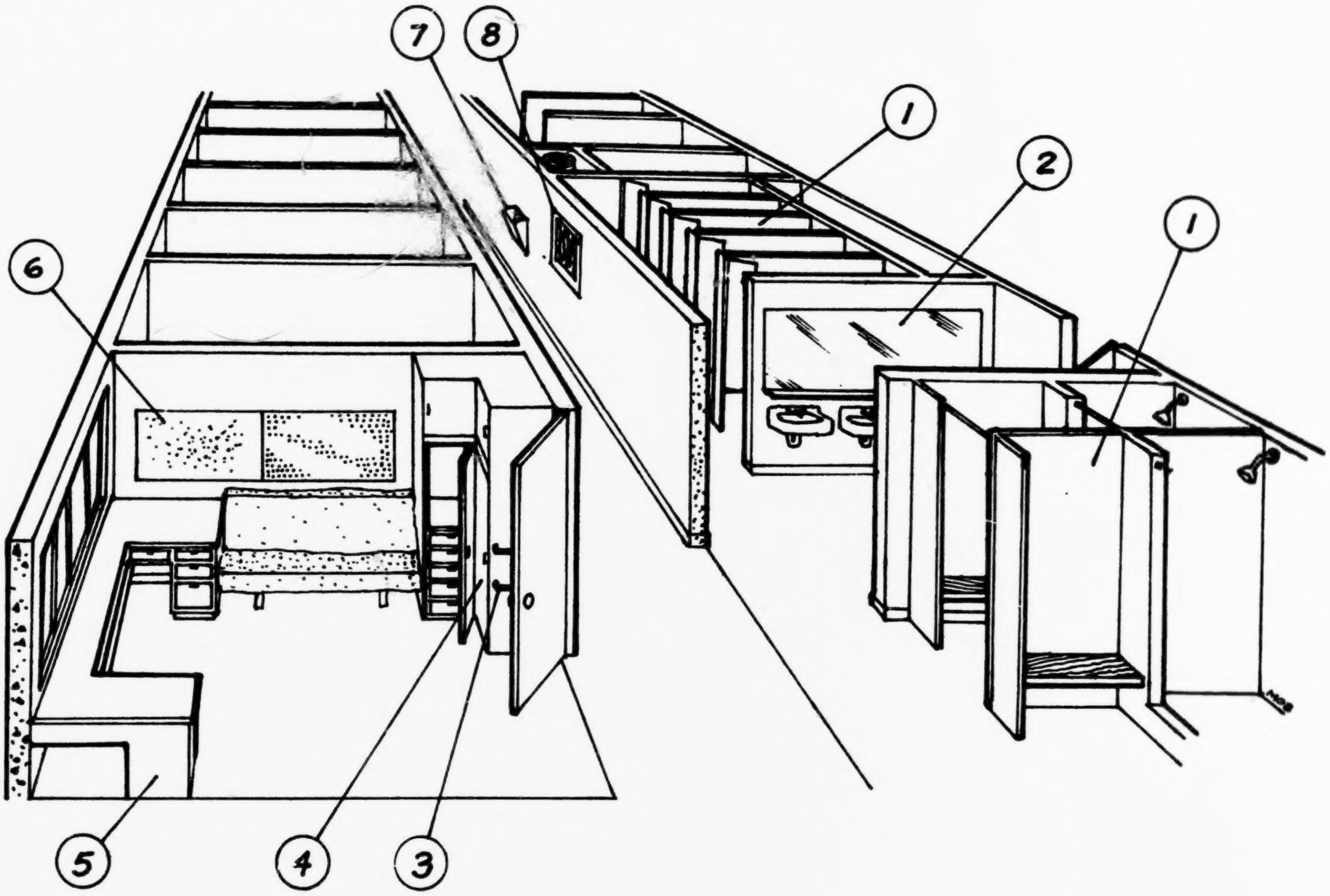


**INTERIOR GENERAL** 44,000 square feet = $ 43,120

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Part. | Furn. | N. S. | | Cust. | Maint. |
| 1. Shower Stalls | 0.11 | | | | 0.11 | H | L |
| 2. Toilet Stalls | 0.09 | | | | 0.09 | L | L |
| 3. Mirrors | 0.05 | | | | 0.05 | H | L |
| 4. Wardrobe Cabinets | | | 0.64 | | 0.64 | L | H |
| 5. Trash Chutes | | | | 0.04 | 0.04 | L | H |
| 6. Tackboards | | 0.05 | | | 0.05 | | |
| | 0.25 | 0.05 | 0.64 | 0.04 | 0.98 | | |

Installed Cost Including Overhead & Profit $49,800 @ $1.13/square foot

RESIDENCE HALL NO. 5, RYERSON, DAVIS

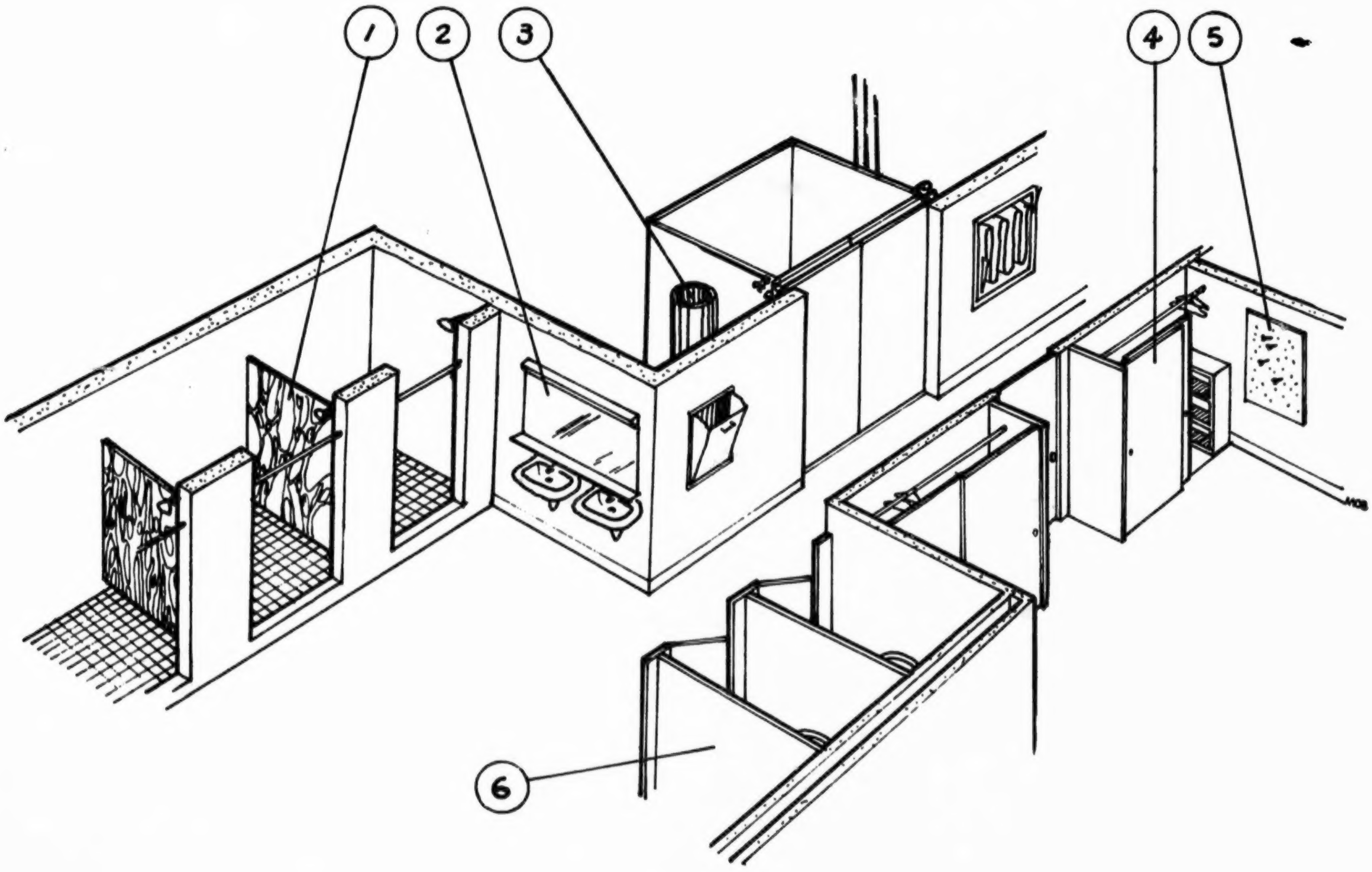


INTERIOR - GENERAL 166,000 square feet = $276,100

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Furn. | Part. | N. S. | | Cust. | Maint. |
| 1. Toilet & Shower Partitions | 0.06 | | | | $0.06 | H | H |
| 2. Mirrors | 0.01 | | | | 0.01 | H | L |
| 3. Tower Bars | 0.05 | | | | 0.05 | L | L |
| 4. Wardrobes | | 0.63 | | | 0.63 | L | L |
| 5. Desks (including Bookshelves) | | 0.75 | | | 0.75 | L | L |
| 6. Pegboard and Corkboard | | | 0.09 | | 0.09 | L | L |
| 7. Trash Chutes | | | | 0.01 | 0.01 | H | L |
| 8. Shelving (not shown) | | 0.04 | | | 0.04 | L | L |
| 9. Fireplace (not shown) | | | | 0.02 | 0.02 | L | |
| | 0.12 | 1.42 | 0.09 | 0.03 | $1.66 | | |

Installed Cost Including Overhead & Profit $318,900 @ $1.92/square foot

RESIDENCE HALL NO. 4, HEDRICK HALL, LOS ANGELES

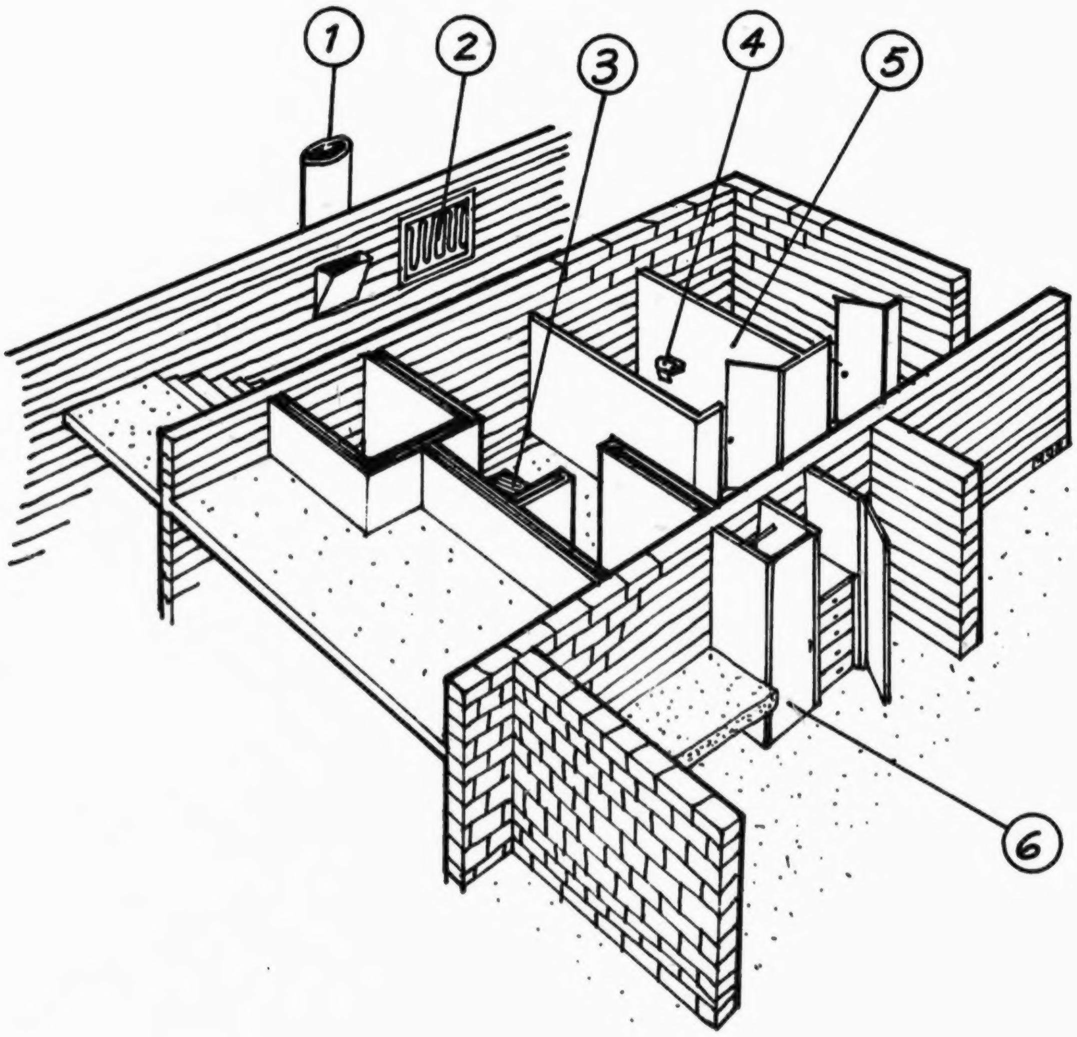


INTERIOR - GENERAL 69,600 square feet = $52,700

| | | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|---|
| | | Bath | Furn. | Part. | N. S. | | Cust. | Maint. |
| 1. | Marble Shower Partitions | 0.01 | | | | $0.01 | H | |
| 2. | Mirrors | 0.02 | | | | 0.02 | H | L |
| 3. | Trash Chutes | | | | 0.01 | 0.01 | H | L |
| 4. | Wardrobe Cabinets | | 0.67 | | | 0.67 | L | L |
| 5. | Tackboards | | | 0.02 | | 0.02 | L | L |
| 6. | Toilet Stalls | 0.03 | | | | 0.03 | H | L |
| | | 0.06 | 0.67 | 0.02 | 0.01 | $0.76 | | |

Installed Cost Including Overhead & Profit $58.674 @ $0.84/square foot

RESIDENCE HALL NO. 4., LOTHIAN HALL, RIVERSIDE



INTERIOR GENERAL 82,200 square feet = $68,710

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Furn | N. S. | | Cust. | Maint. |
| 1. Trash Chutes | | | 0.01 | 0.01 | | |
| 2. Fire Hose Cabinets | | | 0.03 | 0.03 | | |
| 3. Shower Bench | 0.01 | | | 0.01 | H | L |
| 4. Toilet Accessories | 0.04 | | | 0.04 | H | H |
| 5. Toilet Stalls | 0.11 | | | 0.11 | H | L |
| 6. Bed-Storage-Desk Units | | 1.62 | | 1.62 | H | H |
| 7. Shelving (not shown) | | 0.04 | | 0.04 | L | |
| 8. Cabinetwork (not shown) | | 0.04 | | 0.04 | H | |
| | 0.16 | 1.70 | 0.04 | 1.90 | | |

Installed Cost Including Overhead & Profit $79,360 @ $0.97/square foot

RESIDENCE HALL NO. 1, REVELLE, SAN DIEGO

## INTERIOR GENERAL COMPONENT COSTS (TYPE III - V BUILDINGS)

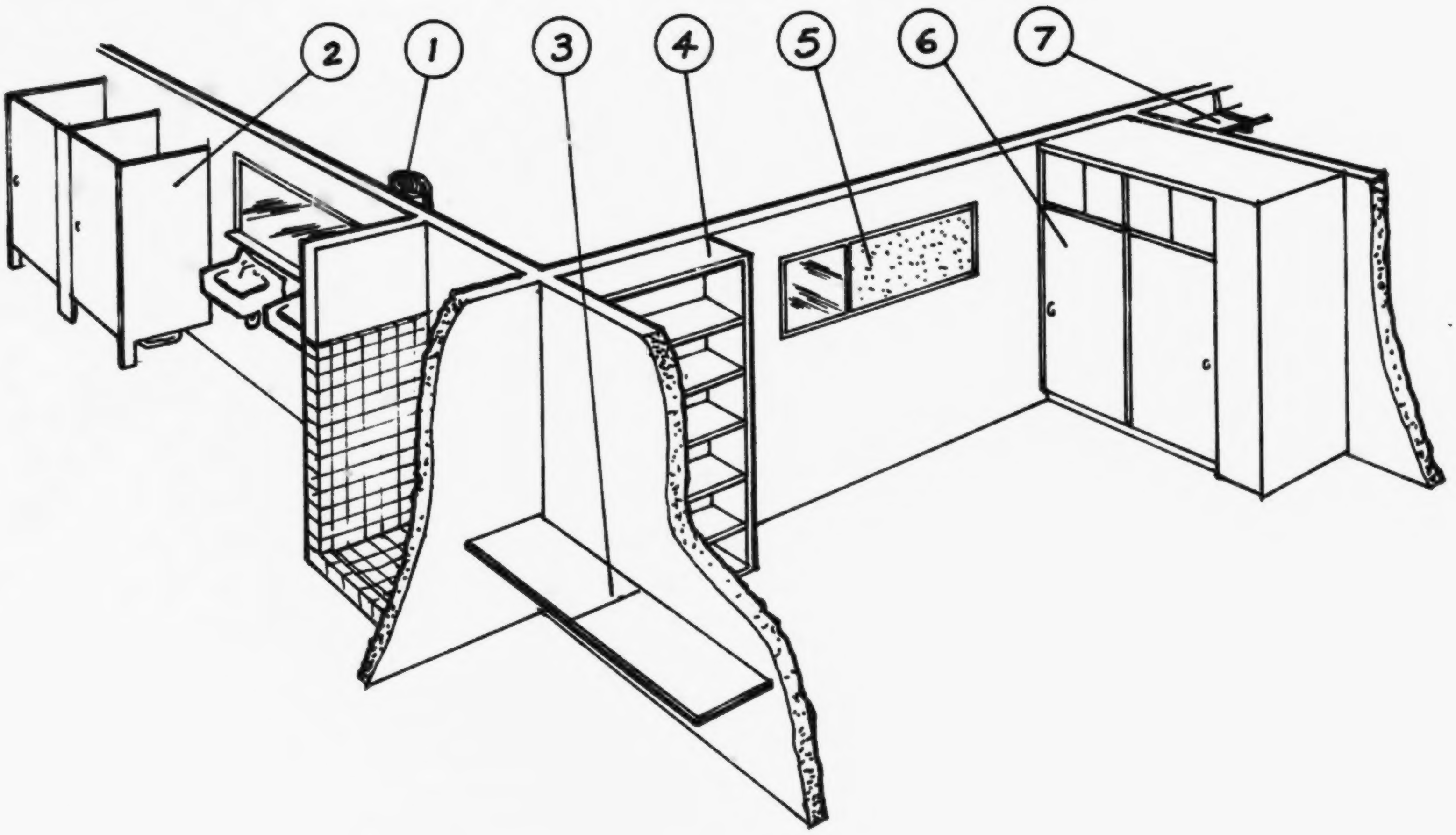
| | CONSTRUCTION COST | | URBS COMPONENT EQUIVALENT per O.G.S.F. | | |
|---|---|---|---|---|---|
| | Per Resident | Per OGSF | Partitions | Bathrm. | Furnishings |
| Regan Hall<br>DAVIS | $208 | $1.05 | $0.04<br>4% | $0.14<br>13% | $0.63<br>60% |
| Mesa Court<br>IRVINE | $332* | $1.62* | - | $0.35<br>22% | $0.58<br>36% |
| Cowell College<br>SANTA CRUZ | $165 | $0.72 | - | $0.16<br>22% | $0.45<br>63% |
| Crown College<br>SANTA CRUZ | ($243) | ($1.11) | - | $0.34<br>30% | $0.57<br>51% |
| Anacapa Hall<br>SANTA BARBARA | $244 | $1.36 | $0.03<br>2% | $0.11<br>8% | $0.96<br>71% |

* High ( ) Median _____ Low

There is less variety in the room storage and wardrobes in the Type III-V group of buildings than in the Type I. All supply basic wardrobes for each student, and sometimes bookshelves. Mesa Court, the highest in this tabulation, provides a built-in dual-lavatory cabinet in the suite baths.

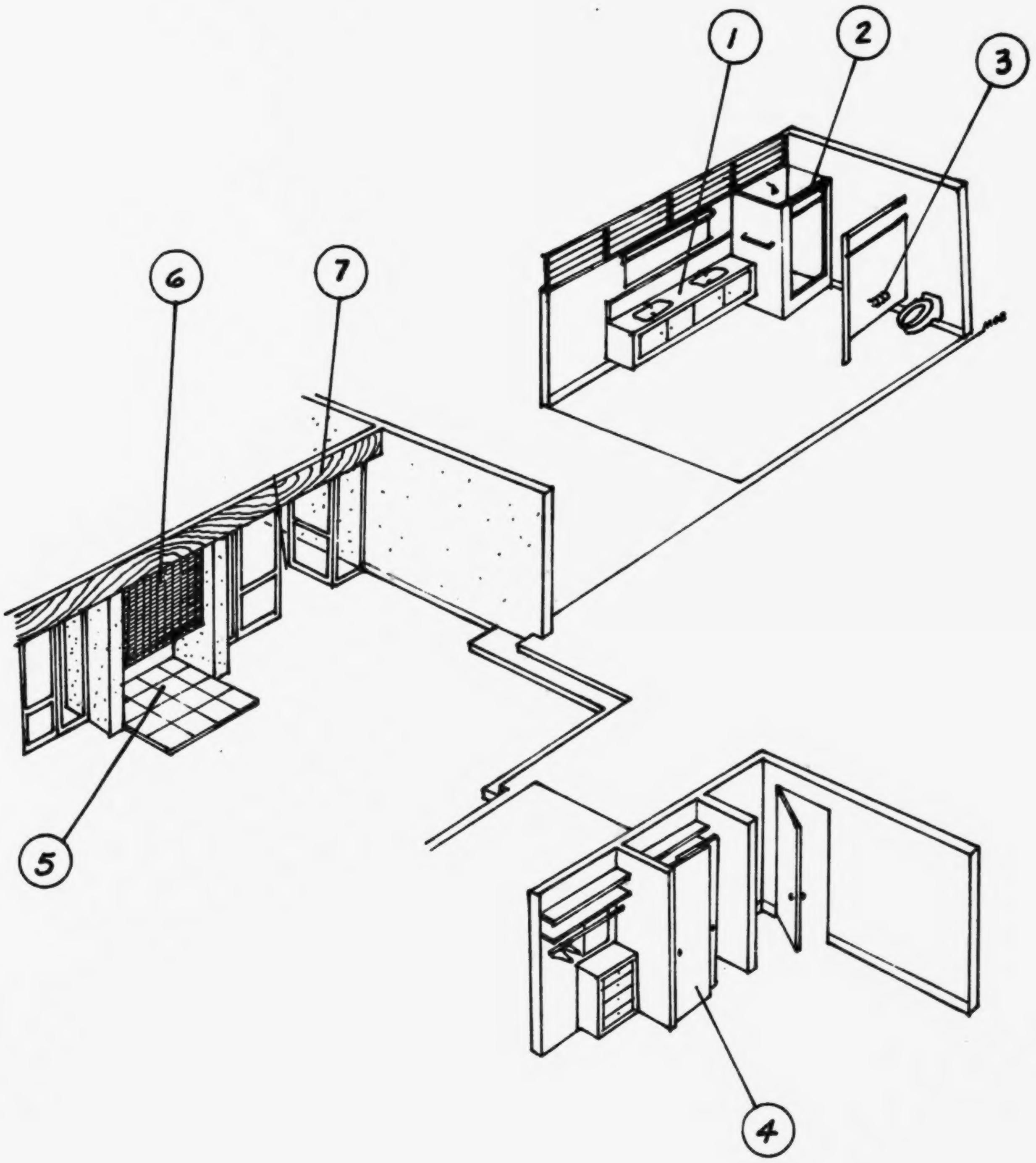
Such furnishings are a universal source of custodial and maintenance care. Trash chutes are a frequent source of isolated fires which cause local damage. A frequent complaint is the inaccessibility of the sprinkler head.

The last section of this study illustrates the wardrobe storage provided for each building.



INTERIOR GENERAL 83,000 square feet = $ 75,680

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Part. | Bath. | Furn. | N.S. | | Cust. | Maint. |
| 1. Trash Chute | | | | 0.01 | 0.01 | | H |
| 2. Toilet Partitions | | 0.14 | | | 0.14 | H | L |
| 3. Typing Tables | | | 0.06 | | 0.06 | L | L |
| 4. Bookshelves | | | 0.07 | | 0.07 | L | L |
| 5. Mirrors, Tackboards | 0.04 | | 0.50 | | 0.04 | H | L |
| 6. Wardrobe Cabinets | | | 0.50 | | 0.50 | H | H |
| 7. Luggage Racks | | | | 0.05 | 0.05 | | L |
| 8. Kitchen Cabinets (not shown) | | | | 0.02 | 0.02 | H | |
| 9. Fireplace (not shown) | | | | 0.02 | 0.02 | L | |
| 10. Control Desk (not shown) | | | | 0.01 | 0.01 | L | L |
| | 0.04 | 0.14 | 0.63 | 0.11 | 0.92 | | |

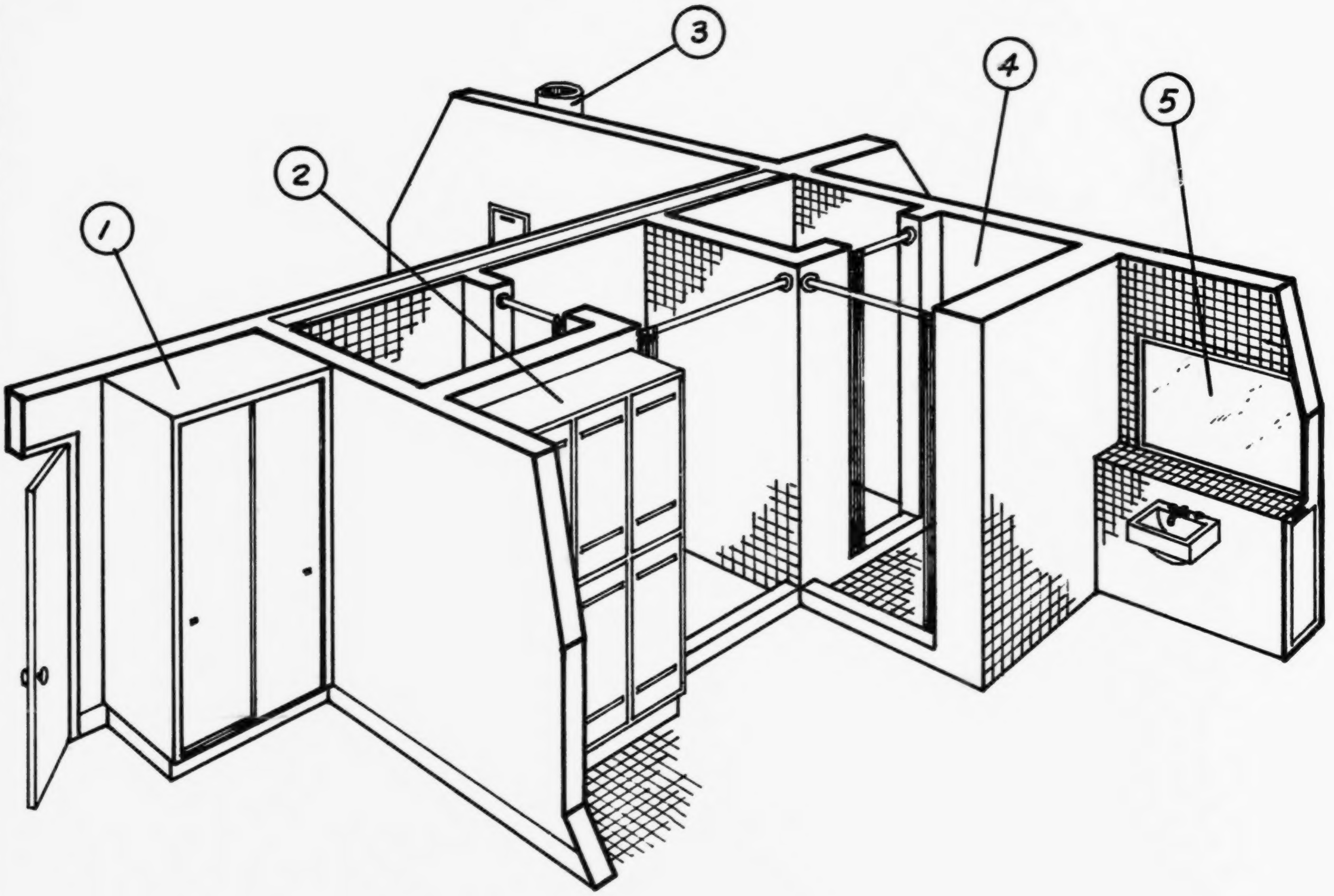


**INTERIOR GENERAL** 83,400 square feet = $117,300

| | | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | | Bath | Furn. | N. S. | | Cust. | Maint. |
| 1. | Cabinets, Mirrors (Bathroom) | 0.10 | | | $0.10 | H | L |
| 2. | Shower & Toilet Stalls | 0.22 | | | 0.22 | H | H |
| 3. | Toilet Accessories | 0.03 | | | 0.03 | L | H |
| 4. | Wardrobes | | 0.58 | | 0.58 | L | H |
| 5. | Fireplaces | | | 0.16 | 0.16 | L | |
| 6. | Glass Wall Tile | | | 0.04 | 0.04 | L | |
| 7. | Finish Carpentry & Paint | | | 0.27 | 0.27 | H | H |
| | | 0.35 | 0.58 | 0.47 | $1.40 | | |

Installed Cost Including Overhead & Profit $135,481 @ $1.62/square foot

RESIDENCE HALL NO. 1, MESA COURT, IRVINE

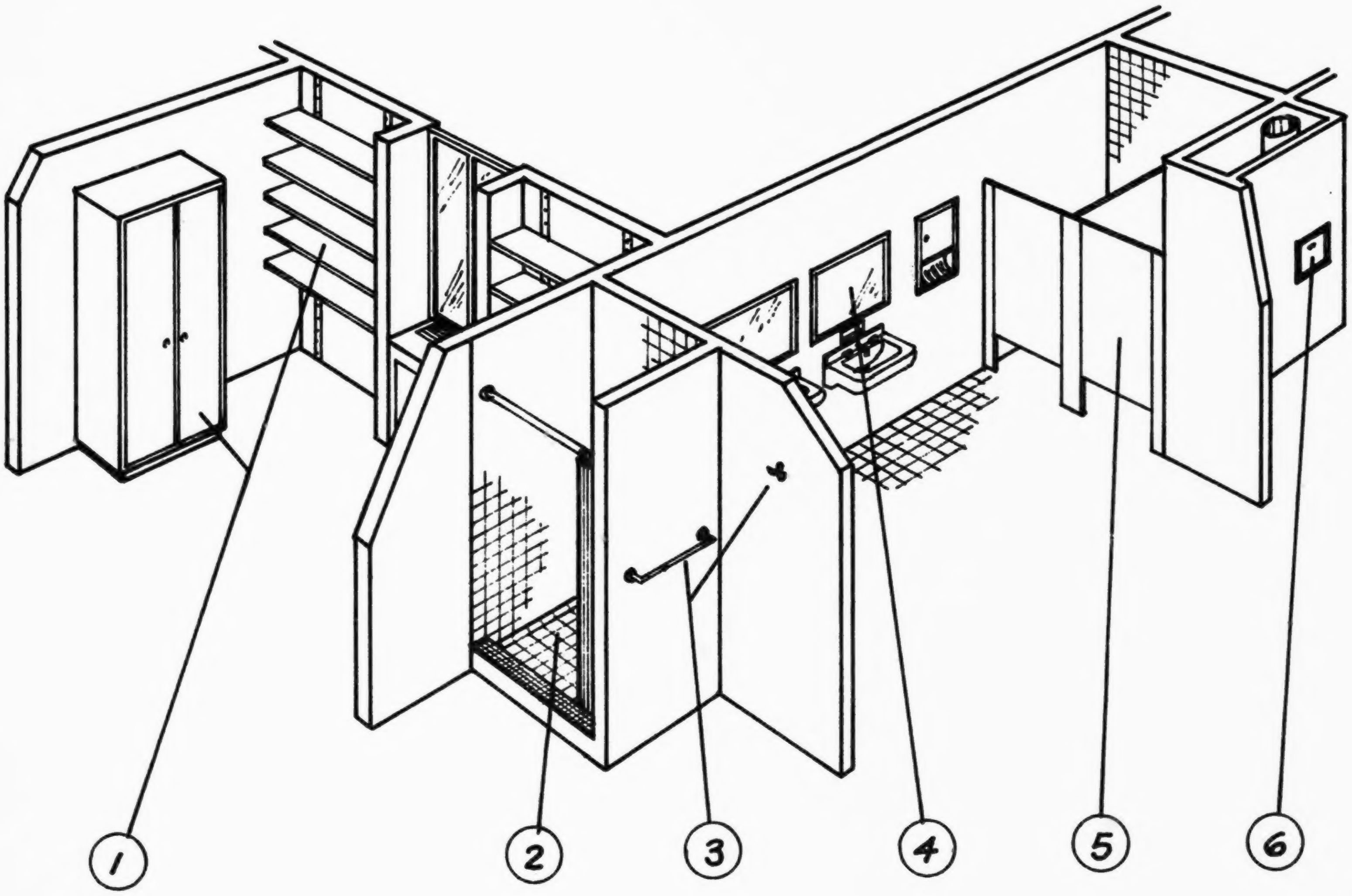


INTERIOR GENERAL 87,514 square feet = $378,210

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Furn. | N. S. | | Cust. | Maint. |
| 1. Wardrobe Cabinets | | 0.45 | | 0.45 | L | H |
| 2. Bathroom Lockers | 0.09 | | | 0.09 | L | L |
| 3. Trash Chute | | | 0.01 | 0.01 | | H |
| 4. Toilet & Shower Partitions | 0.04 | | | 0.04 | H | L |
| 5. Mirrors | 0.03 | | | 0.03 | H | L |
| | 0.16 | 0.45 | 0.01 | $0.62 | | |

Installed Cost Including Overhead & Profit $68,480 @ $0.72/square foot

RESIDENCE HALL NO. 1, COWELL, SANTA CRUZ

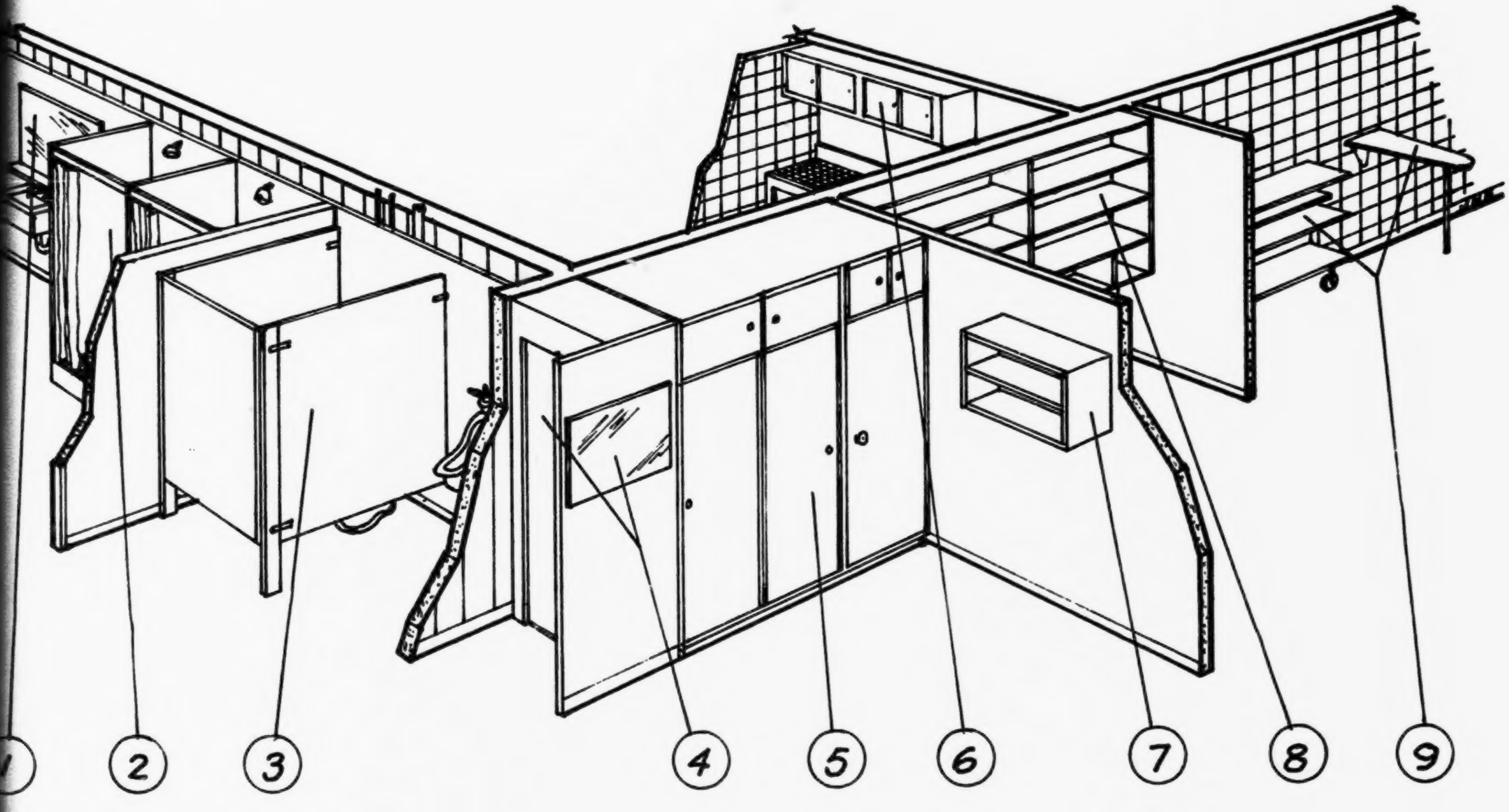


INTERIOR GENERAL 87,600 square feet = $84,050

| | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | Bath | Furn. | N. S. | | Cust. | Maint. |
| 1. Wardrobe & Shelving | | 0.57 | | 0.57 | L | H |
| 2. Shower Stalls | 0.12 | | | 0.12 | H | H |
| 3. Bath Accessories | 0.04 | | | 0.04 | L | H |
| 4. Mirrors | 0.01 | | | 0.01 | H | L |
| 5. Toilet Stalls | 0.17 | | | 0.17 | L | L |
| 6. Trash Chutes | | | 0.05 | 0.05 | | H |
| | 0.34 | 0.57 | 0.05 | 0.96 | | |

Installed Cost Including Overhead & Profit $97,078 @ $1.11/square foot

RESIDENCE HALL NO. 3, CROWN, SANTA CRUZ



INTERIOR GENERAL 75,000 square feet = $88,560

| | URBS COMPONENT EQUIVALENT | | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | Bath | Furn. | Part. | N.S. | | Cust. | Maint. |
| 1. Bath Mirror and Shelf | 0.02 | | | | 0.02 | H | H |
| 2. Bath Accessories | 0.02 | | | | 0.02 | L | H |
| 3. Toilet Partitions | 0.07 | | | | 0.07 | L | L |
| 4. Room Mirror Tackboard | | 0.03 | 0.03 | | 0.06 | L | L |
| 5. Wardrobe Closets | | 0.76 | | | 0.76 | L | H |
| 6. Lounge Cabinets | | | | 0.07 | 0.07 | L | L |
| 7. Room Bookcases | | 0.11 | | | 0.11 | L | H |
| 8. Lobby Shelving | | 0.01 | | | 0.01 | L | L |
| 9. Ironing Board and Tables | | | | 0.01 | 0.01 | L | H |
| 10. Fireplace (not shown) | | | | 0.02 | 0.02 | L | |
| 11. Luggage Rack (not shown) | | 0.05 | | | 0.05 | | L |
| | 0.11 | 0.96 | 0.03 | 0.10 | 1.20 | | |

Installed Cost Including Overhead and Profit $102,287 @ $1.36/square foot.

RESIDENCE HALL NO. 2, ANACAPA, SANTA BARBARA

### EXTERIOR SKIN COMPONENT COSTS (TYPE I BUILDINGS)

| | CONSTRUCTION COST | | | URBS COMPONENT EQUIV. per O.G.S.F. |
|---|---|---|---|---|
| | Per sq. ft. of Component | Per Resident | Per OGSF | Structure-ceiling |
| Priestly Hall<br>BERKELEY | $5.35 | $830* | $4.54* | $2.29<br>50% |
| Ryerson Hall<br>DAVIS | ($5.08) | ($672) | $3.12 | $0.68<br>22% |
| Hedrick Hall<br>LOS ANGELES | $4.77 | $5.13 | $2.58 | $0.27<br>10% |
| Lothian Hall<br>RIVERSIDE | $6.78* | $643 | $3.90 | $1.95<br>50% |
| Revelle Hall<br>SAN DIEGO | $3.57 | $588 | ($3.17) | $1.38<br>44% |

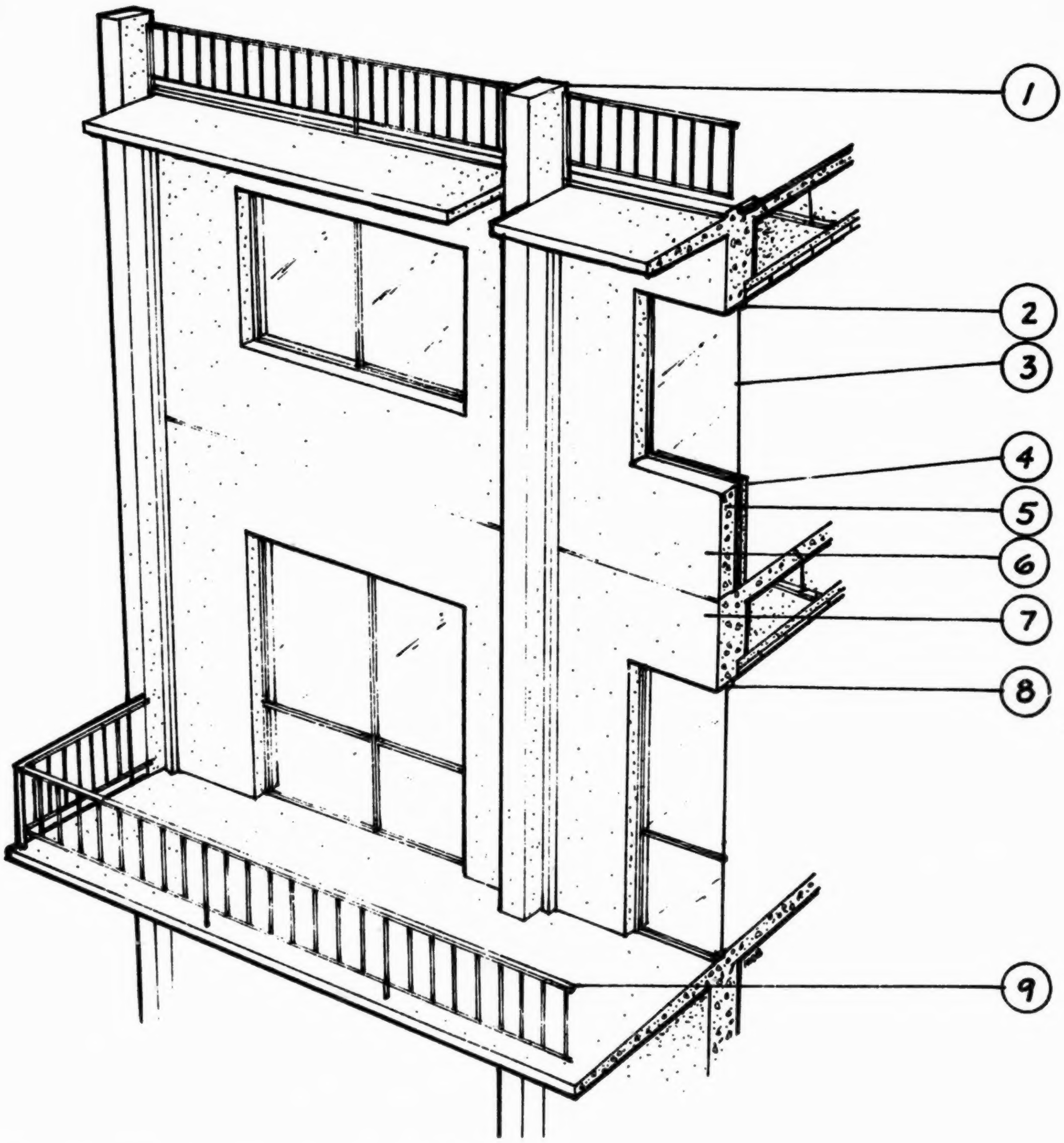
* High ( ) Median _____ Low

All of the Type I buildings have masonry or concrete exterior walls with ventilating windows. The most expensive by unit cost is the precast concrete slab and window-panel combination at Lothian Hall. The Priestly wall is the most expensive per building O.G.S.F. because there is a large C-Ratio (the relationship of exterior wall to floor area).

The concrete masonry exterior walls of Revelle Hall are least expensive by unit cost, but increase in O.G.S.F. cost because of the proportion of wall to floor. Hedrick Hall's basic wall of brick-faced concrete, is lowest per O.G.S.F.

The amount of exterior wall considered equivalent to the URBS structural component was that portion serving as shear wall in the buildings. No veneers or finishes were included in this allocation.

Custodial costs for window glass vary from light to heavy with the degree of difficulty of access. Painted surfaces and exterior doors are the sources of greatest maintenance charges.

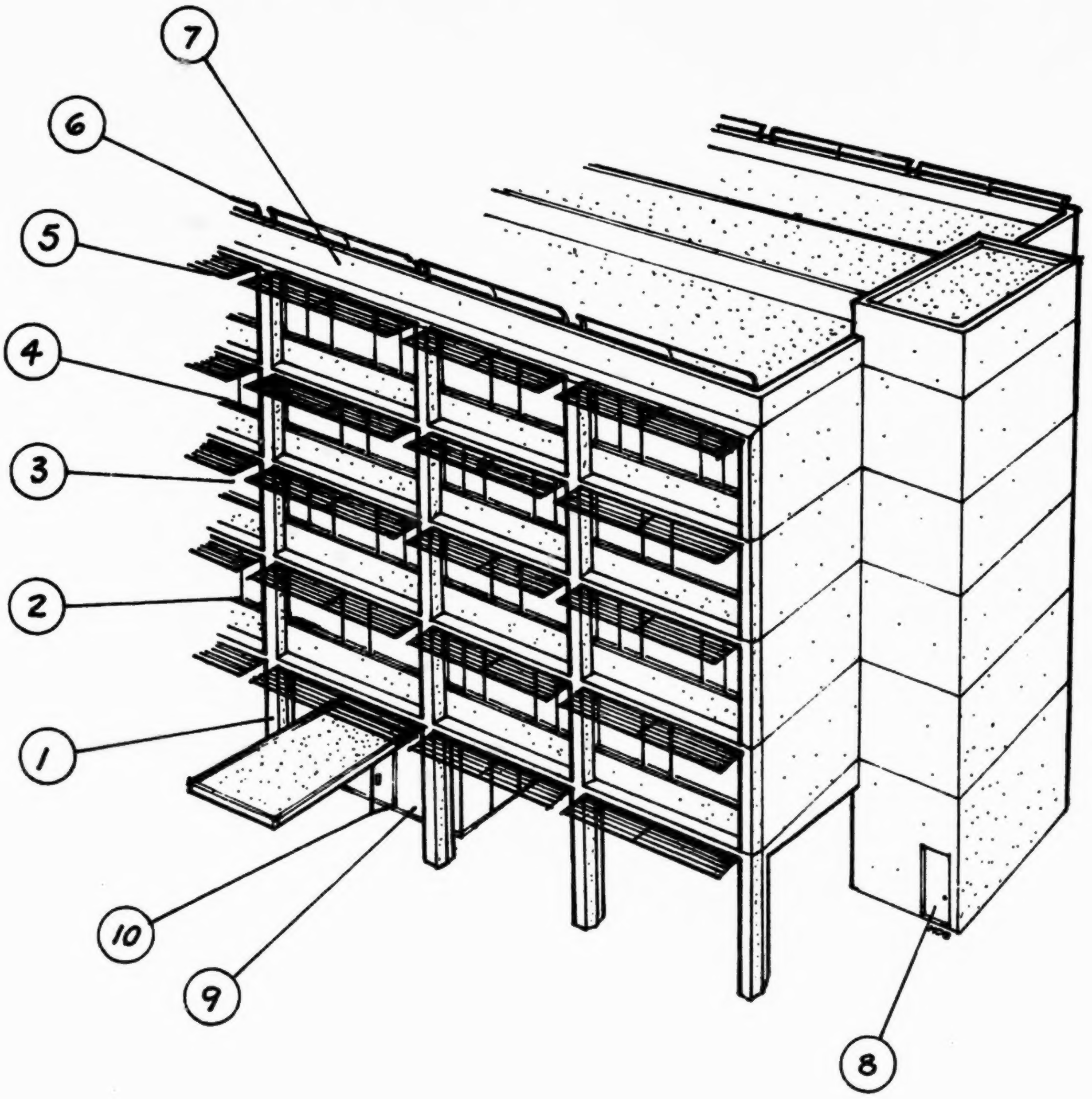


EXTERIOR SKIN 34,000 square feet = $162,200
C - Ratio (Component in Square Feet/OGSF) 0.85

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Structure Ceiling | Non-System | | Cust. | Maint. |
| 1. Concrete Columns | 0.45 | | 0.45 | | |
| 2. Windows | | 0.33 | 0.33 | H | L |
| 3. Glazing | | 0.21 | 0.21 | L | L |
| 4. Metal Lath and Plaster | | 0.60 | 0.60 | | |
| 5. Concrete Walls | 2.24 | | 2.24 | | |
| 6. Finish Concrete | | 0.20 | 0.20 | | |
| 7. Paint (Interior& Exterior) | | 0.32 | 0.32 | H | H |
| 8. Sliding Doors | | 0.05 | 0.05 | L | H |
| 9. Metal Railings | | 0.15 | 0.15 | | L |
| 10. Store Front (not shown) | | 0.24 | 0.24 | | L |
| | 2.69 | 2.10 | 4.79 | | |

Installed Cost Including Overhead and Profit $181,936 @$5.35/square foot.

RESIDENCE HALL NO. 3, PRIESTLY, BERKELEY

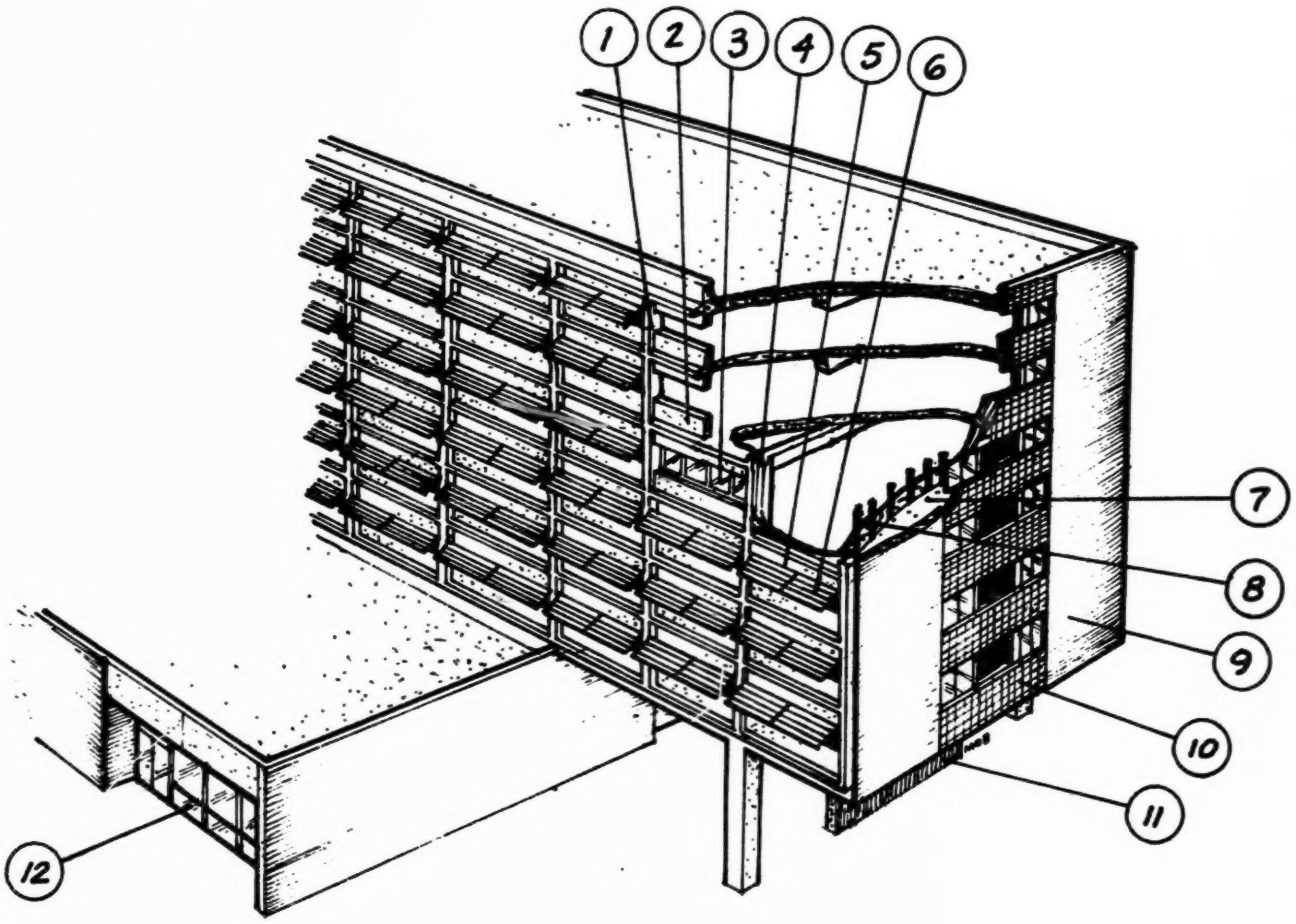


EXTERIOR SKIN 27,000 square feet = $118,580
C - Ratio (Component in Square Feet/OGSF) = 0.59

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Struct.Ceil. | N.S. | | Cust. | Maint. |
| 1. Concrete Walls and Columns | 1.11 | | 1.11 | | |
| 2. Metal Windows | | 0.46 | 0.46 | | L |
| 3. Glazing | | 0.59 | 0.59 | L | L |
| 4. Sheet Metal Frames | | 0.39 | 0.39 | | L |
| 5. Aluminum Sunshades | | 0.26 | 0.26 | | |
| 6. Metal Railings | | 0.19 | 0.19 | | L |
| 7. Paint (Exterior & Interior) | | 0.25 | 0.25 | L | H |
| 8. Exit Doors | | 0.07 | 0.07 | L | L |
| 9. Window Wall | | 1.00 | 1.00 | L | L |
| 10. Entry Doors | | 0.07 | 0.07 | L | H |
| | 1.11 | 3.28 | 4.39 | | |

Installed Cost Including Overhead and Profity $136,960 @ $5.08/square foot.

RESIDENCE HALL NO. 5, RYERSON, DAVIS

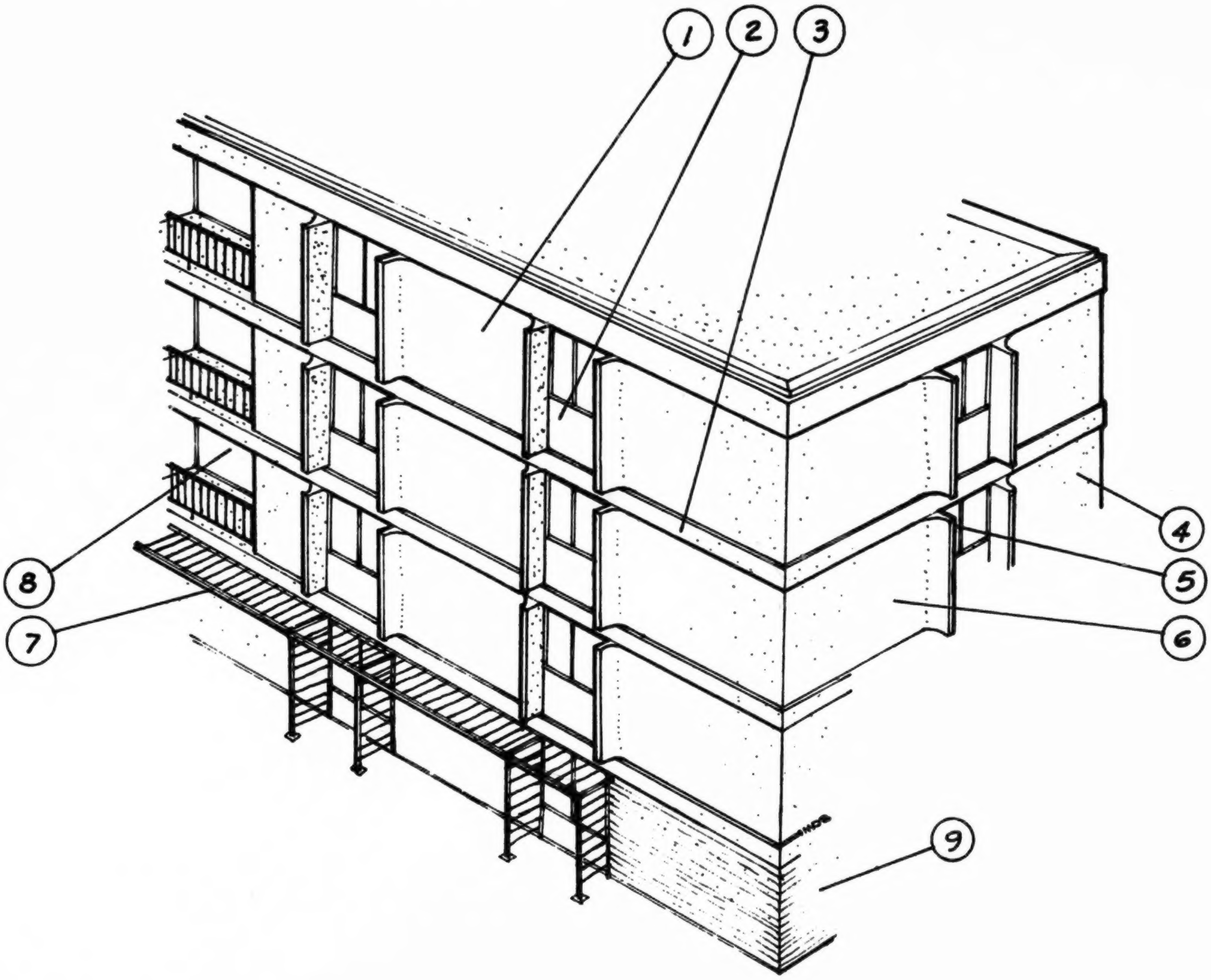


EXTERIOR SKIN 90,000 square feet = $371,400
C- Ratio (Component in Square Feet/OGSF = 0.55

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Struc-Ceil. | N. S. | | Cust. | Maint. |
| 1. Concrete Pilasters | | 0.13 | 0.13 | | |
| 2. Concrete Spandrels | | 1.03 | 1.03 | | |
| 3. Windows and Glazing | | 0.96 | 0.96 | L | L |
| 4. Concrete Columns | 0.47 | | 0.47 | | |
| 5. Exterior Paint | | 0.17 | 0.17 | L | H |
| 6. Metal Sunshades | | 0.43 | 0.43 | | |
| 7. Metal Stud, Lath & Plaster Walls | | 0.25 | 0.25 | | |
| 8. Interior Paint | | 0.11 | 0.11 | L | H |
| 9. Split-Brick Veneer | | 0.29 | 0.29 | | |
| 10. Precast Concrete Grille | | 0.09 | 0.09 | | |
| 11. Concrete Walls | 0.03 | 0.03 | 0.06 | | |
| 12. Window Wall | | 0.14 | 0.14 | L | L |
| | 0.50 | 3.63 | 4.13 | | |

Installed Cost Including Overhead & Profit $428,970 @ $4.77/square foot

RESIDENCE HALL NO. 4, HEDRICK, LOS ANGELES

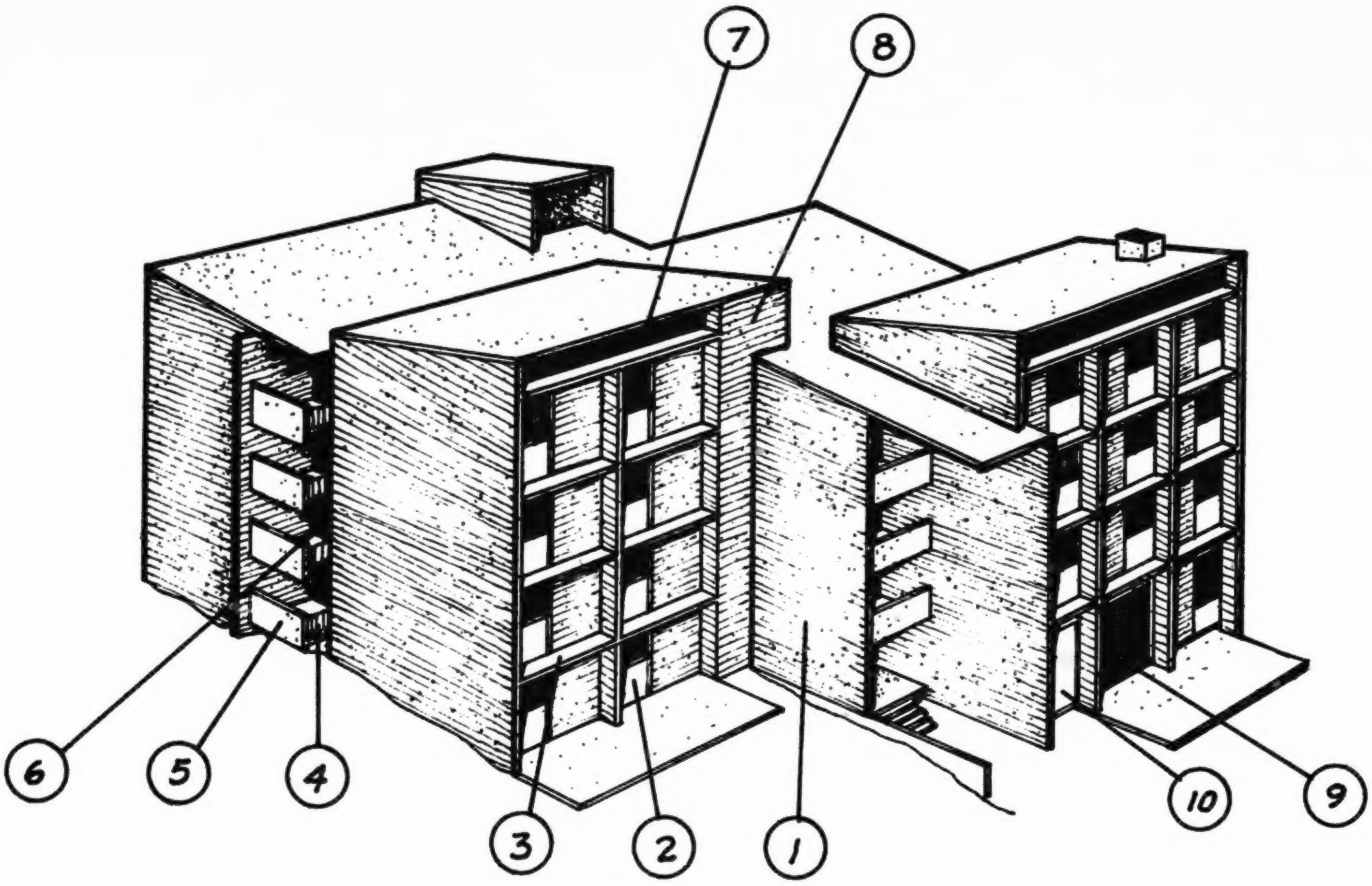


EXTERIOR SKIN 40,000 square feet = $234,800
C- Ratio (Component in Square Feet/OGSF) = 0.58

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Struc-Ceil. | N. S. | | Cust. | Maint. |
| 1. Precast Concrete Wall Panels | 2.40 | | $2.40 | | |
| 2. Window Panels | | 0.90 | 0.90 | H | L |
| 3. Concrete Bands | 0.80 | | 0.80 | | |
| 4. Concrete End Walls | 0.20 | | 0.20 | | |
| 5. Interior Finish & Paint | | 0.15 | 0.15 | L | H |
| 6. Exterior Finish & Paint | | 0.20 | 0.20 | | H |
| 7. Metal Sun Screen | | 0.28 | 0.28 | L | H |
| 8. Balcony Doors, Etc. | | 0.80 | 0.80 | H | L |
| 9. Brick Veneer | | 0.14 | 0.14 | | |
| | 3.40 | 2.47 | $5.87 | | |

Installed Cost Including Overhead & Profit $271,286 @ $6.78/square foot

RESIDENCE HALL NO. 4, LOTHIAN HALL, RIVERSIDE



EXTERIOR SKIN 72,960 square feet = $225,369
C- Ratio (Component in Square Feet OGSF) = 0.89

| | | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | | Struc-Ceil. | N. S. | | Cust. | Maint. |
| 1. | Concrete Block Wall | 1.55 | | $1.55 | | |
| 2. | Cement Asbestos Window Panels | | 0.52 | 0.52 | | L |
| 3. | P. C. Concrete Eyebrow | | 0.04 | 0.04 | | |
| 4. | Balcony Railing | | 0.01 | 0.01 | L | L |
| 5. | Balcony P.C. Concrete Panels | | 0.02 | 0.02 | | |
| 6. | Balcony Sliding Glass | | 0.20 | 0.20 | H | L |
| 7. | Fixed Clerestory | | 0.10 | 0.10 | H | H |
| 8. | Exterior Paint & Sealant | | 0.20 | 0.20 | H | H |
| 9. | Lounge Storefront | | 0.24 | 0.24 | H | H |
| 10. | Exterior Doors | | 0.12 | 0.12 | H | H |
| 11. | Plaster (not shown) | | 0.02 | 0.02 | | |
| 12. | Interior Paint (not shown) | | 0.01 | 0.01 | L | H |
| 13. | Cement Base (not shown) | | 0.06 | 0.06 | | |
| | | 1.55 | 1.54 | $3.09 | | |

Installed Cost Including Overhead & Profit $260,301 @ $3.57/square foot

RESIDENCE HALL NO. 1, REVELLE HALL, SAN DIEGO

## EXTERIOR SKIN COMPONENT COSTS (TYPE III - V BUILDINGS)

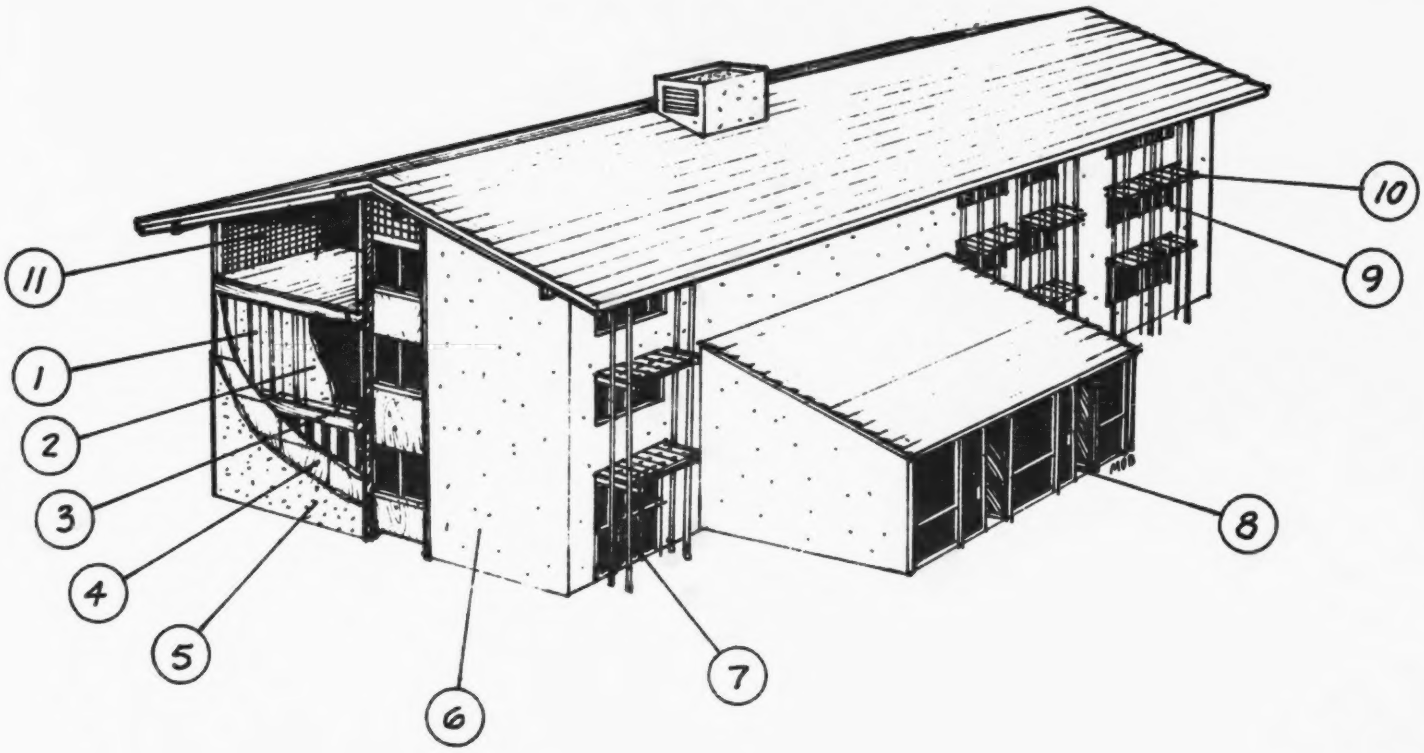
| | CONSTRUCTION COST | | | URBS COMPONENT EQUIV. per O.G.S.F. | |
|---|---|---|---|---|---|
| | Per sq. ft. of Component | Per Resident | Per OGSF | Structure-ceiling | Bathrooms |
| Regan Hall<br>DAVIS | ($2.97) | $393 | $1.98 | $0.29<br>15% | $0.03<br>1.5% |
| Mesa Court<br>IRVINE | $2.43 | ($476) | ($2.33) | $0.58<br>25% | - |
| Cowell College<br>SANTA CRUZ | $4.99* | $1050* | $4.60* | $2.22<br>48% | - |
| Crown College<br>SANTA CRUZ | $2.73 | $957 | $4.36 | $1.27<br>37% | - |
| Anacapa Hall<br>SANTA BARBARA | $4.59 | $405 | $2.30 | $0.40<br>17% | - |

* High  ( ) Median  ____ Low

The two Type III buildings, Cowell College and Anacapa Hall record the highest unit prices although Anacapa is next to low in cost per O.G.S.F. because of its small ratio of exterior wall to floor area (C-Ratio of .61). The low-cost wall at Mesa Court is integrally colored stucco on wood studs.

As in the Type I buildings, the basic exterior wall structure when used as a shear wall is applied to the URBS equivalent cost group.

The factors involved in custodial and maintenance cost are painted surfaces, exterior doors and windows.

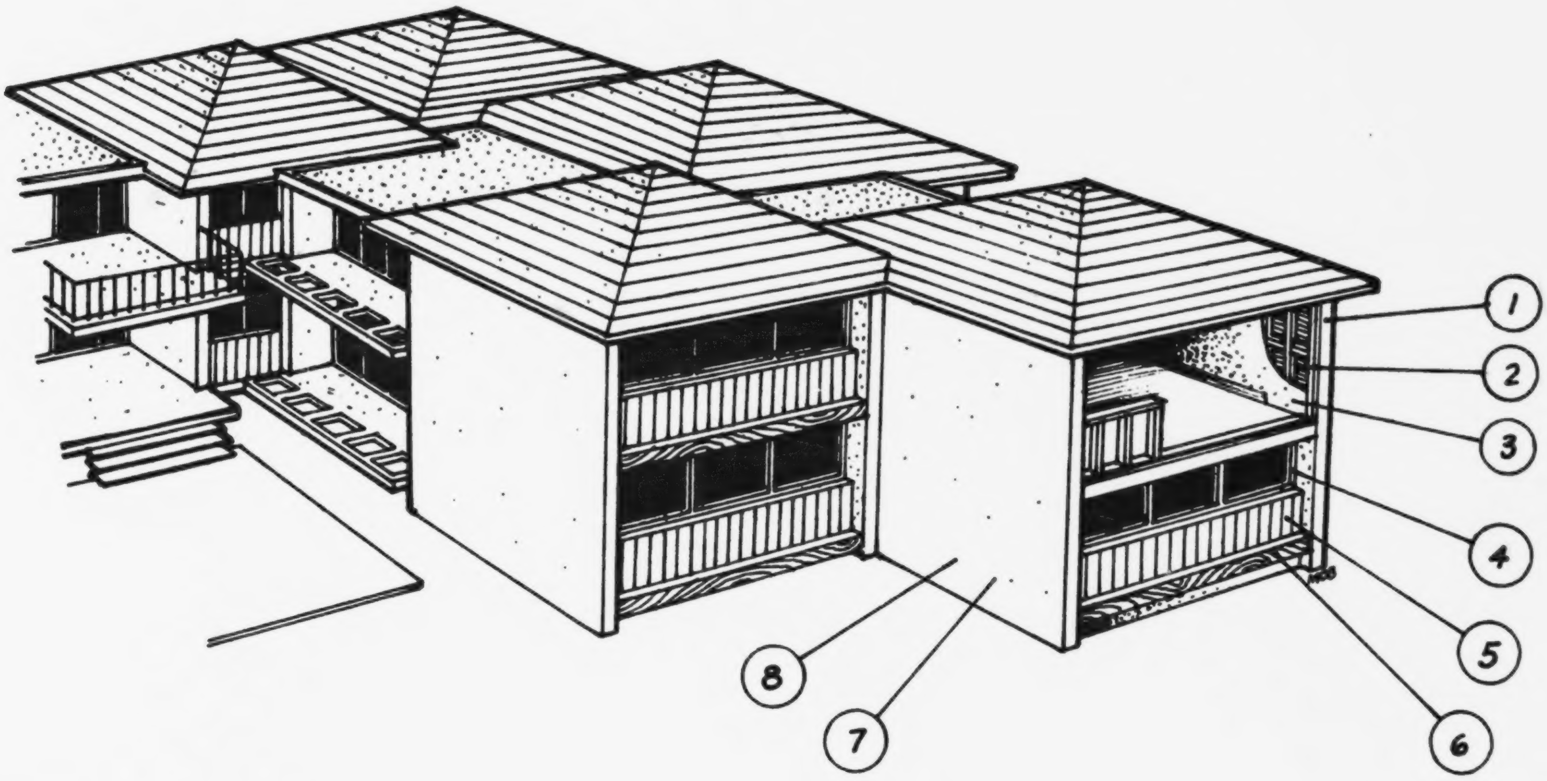


**EXTERIOR SKIN** 55,500 square feet = $142,833
C- Ratio (Component in Square Feet/OGSF) = 0.67

| | | URBS COMPONENT EQUIVALENT | | | SUBCOST | | |
|---|---|---|---|---|---|---|---|
| | | Bath | Struc-Ceil. | N. S. | | Cust. | Maint. |
| 1. | Wood Stud Wall | | 0.24 | | 0.24 | | |
| 2. | Gypsum Board | | | 0.16 | 0.16 | | |
| 3. | Rubber Base | | | 0.09 | 0.09 | L | L |
| 4. | Plywood Sheathing | | 0.19 | | 0.19 | | |
| 5. | Studdo | | | 0.37 | 0.37 | | L |
| 6. | Exterior Paint | | | 0.19 | 0.19 | L | H |
| 7. | Entrance Doors | | | 0.16 | 0.16 | H | H |
| 8. | Storefront | | | 0.34 | 0.34 | L | L |
| 9. | Windows | | | 0.57 | 0.57 | L | L |
| 10. | Wood Trellises | | | 0.16 | 0.16 | | H |
| 11. | Ceramic Wall Tile | 0.05 | | | 0.06 | H | H |
| 12. | Interior Paint (not shown) | | | 0.05 | 0.05 | L | H |
| 13. | Metal Doors (not shown) | | | 0.07 | 0.07 | L | L |
| 14. | Sliding Glass Doors (not shown) | | | 0.03 | 0.03 | L | H |
| | | 0.05 | 0.43 | 2.05 | 2.53 | | |

Installed Cost Including Overhead & Profit $164,908 @ $2.97/square feet

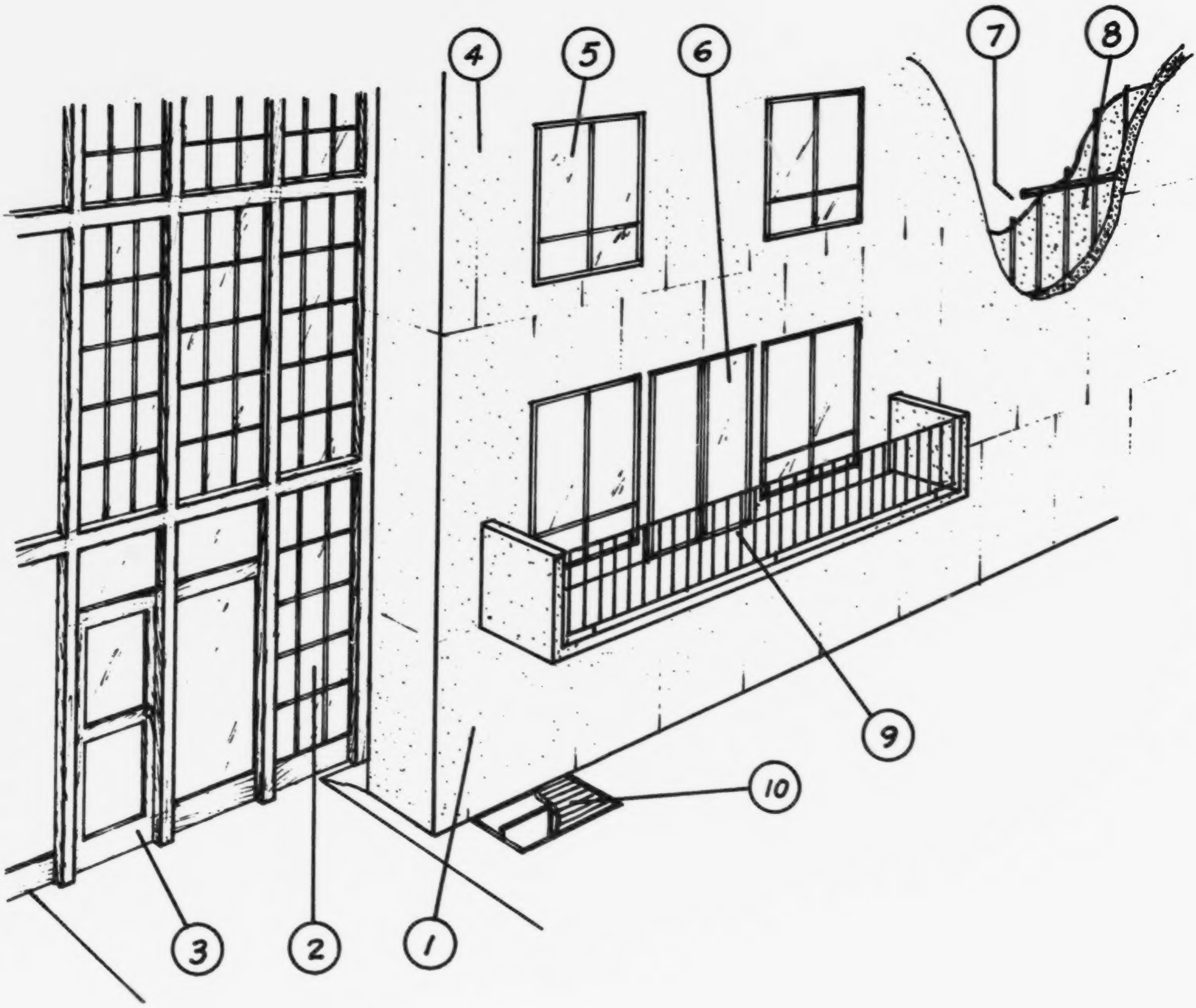
RESIDENCE HALL NO. 6, REGAN, DAVIS



EXTERIOR SKIN 80,000 square feet = $168,250
C- Ratio (Component in Square Feet/OGSF) = 0.96

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Struc-Ceil. | N. S. | | Cust. | Maint. |
| 1. Exterior Wall Frame | 0.20 | | $0.20 | | |
| 2. Thermal Insulation | | 0.09 | 0.09 | | |
| 3. Interior Gypsum Lath & Plaster | 0.19 | | 0.19 | | H |
| 4. Aluminum Windows & Glazing | | 1.07 | 1.07 | L | L |
| 5. Exterior Wood Siding | | 0.08 | 0.08 | L | H |
| 6. Exterior Wood Trim | | 0.20 | 0.20 | L | H |
| 7. Exterior Stucco | 0.22 | | 0.22 | L | H |
| 8. Exterior Paint | | 0.05 | 0.05 | L | H |
| | $0.61 | $1.49 | $2.10 | | |

Installed Cost Including Overhead & Profit $194,329 @ $2.43/square foot

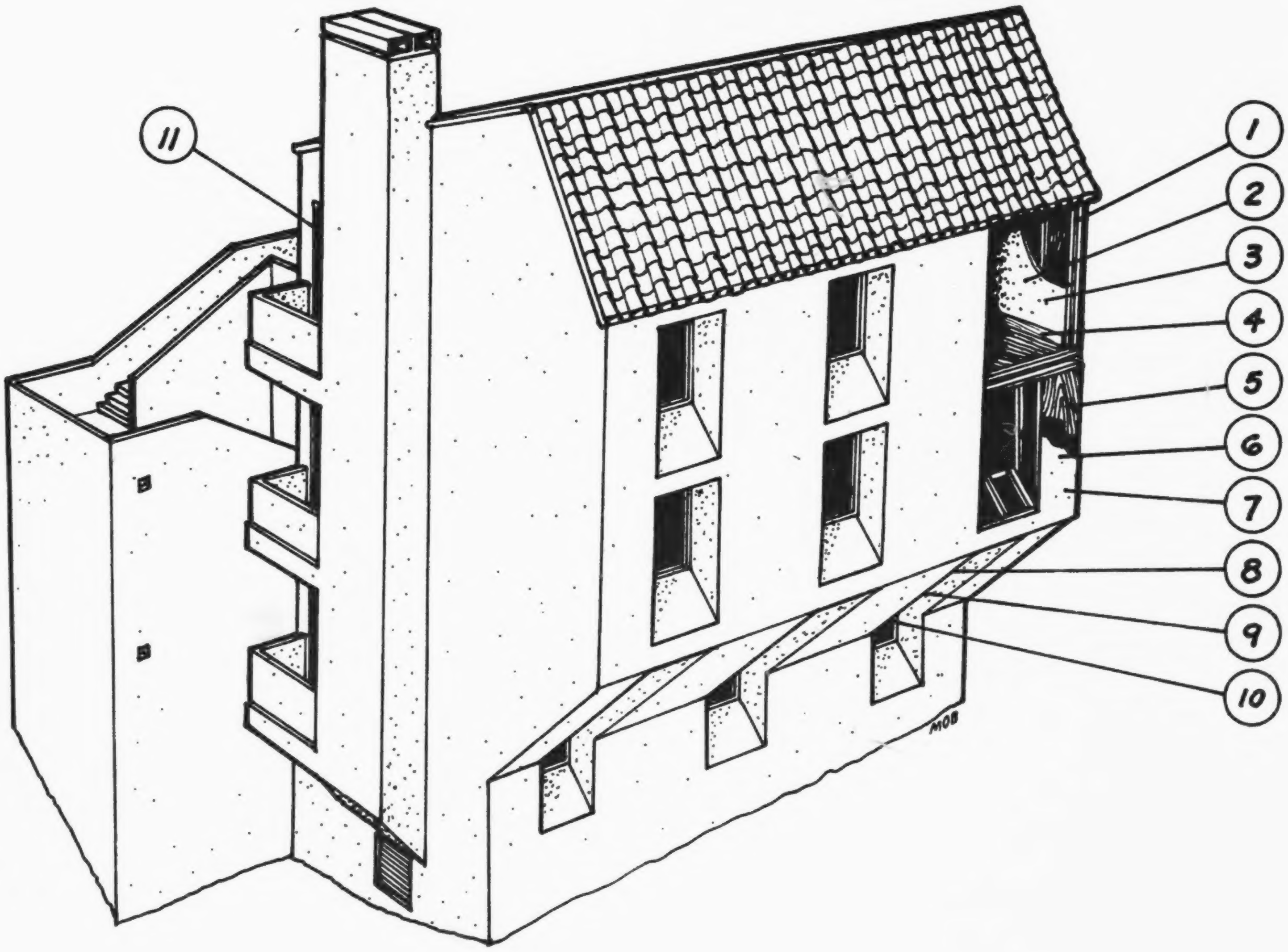


EXTERIOR SKIN 87,514 square feet = $378,210
C- Ratio (Component in Square Feet/OGSF) = 0.98

| | | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | | Struc-Ceil. | N. S. | | Cost. | Maint. |
| 1. | Concrete Walls | 2.40 | | $2.40 | | |
| 2. | Wood and Aluminum Curtain Wall | | 0.20 | 0.20 | H | L |
| 3. | Wood Doors | | 0.02 | 0.02 | H | H |
| 4. | Exterior Paint | | 0.19 | 0.19 | L | H |
| 5. | Metal Windows with Glazing | | 0.78 | 0.78 | L | L |
| 6. | Glass Doors | | 0.05 | 0.05 | H | H |
| 7. | Interior Paint | | 0.12 | 0.12 | H | H |
| 8. | Gypsum Board Furring | | 0.34 | 0.34 | | |
| 9. | Balcony Railing | | 0.05 | 0.05 | | L |
| 10. | Steel Area Grilles | | 0.02 | 0.02 | | |
| 11. | Wood Base (not shown) | | 0.04 | 0.04 | L | L |
| 12. | Metal Doors (not shown) | | 0.11 | 0.11 | L | L |
| | | 2.40 | 1.92 | $4.32 | | |

Installed Cost Including Overhead & Profit $436,833 @ $4.99/square foot

RESIDENCE HALL NO. 1, COWELL COLLEGE, SANTA CRUZ

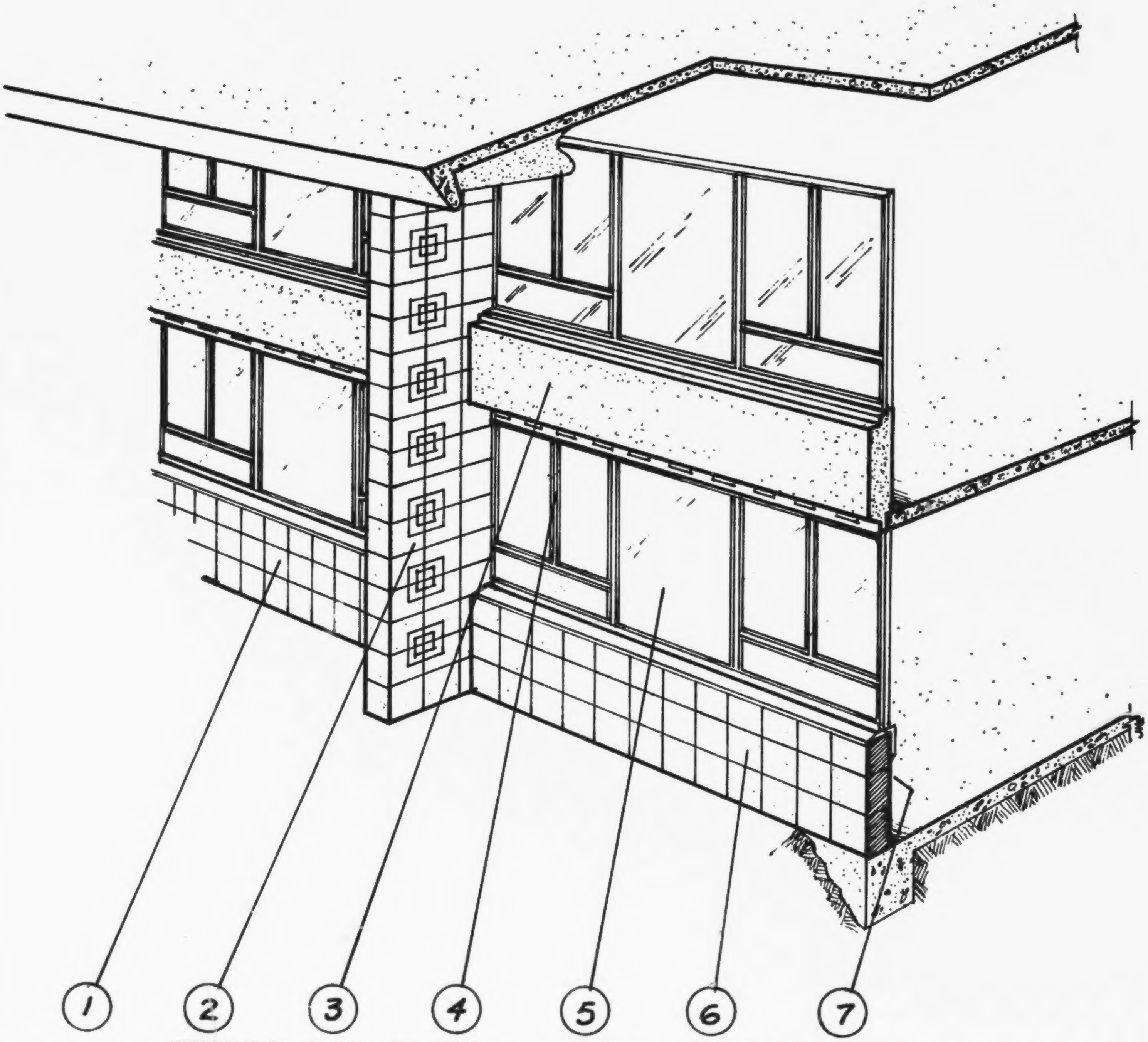


EXTERIOR SKIN 140,000 square feet = $331,370
C- Ratio (Component in Square Feet/OGSF) = 1.63

| | | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|---|
| | | Struct.-Ceil. | N. S. | | Cust. | Maint. |
| 1. | Wood Framing | 0.40 | | 0.40 | | |
| 2. | Gypsum Board | | 0.18 | 0.18 | | |
| 3. | Interior Paint on Gypsum | | 0.12 | 0.12 | L | H |
| 4. | Interior Trim | | 0.04 | 0.04 | L | L |
| 5. | Plywood Structural Sheathing | 0.40 | | 0.40 | | |
| 6. | Stucco | | 0.45 | 0.45 | | H |
| 7. | Exterior Paint | | 0.20 | 0.20 | L | H |
| 8. | Metal Lath & Plaster | | 0.10 | 0.10 | | |
| 9. | Interior Paint on Plaster | | 0.04 | 0.04 | L | H |
| 10. | Windows & Glazing | | 0.38 | 0.38 | L | H |
| 11. | Exit Doors | | 0.06 | 0.06 | L | L |
| | | 0.80 | 1.57 | 2.37 | | |

Installed Cost Including Overhead & Profit $382,732 @ $2.73/square foot

RESIDENCE HALL NO. 3, CROWN, SANTA CRUZ



EXTERIOR SKIN 37,500 square feet = $147,300
C- Ratio (Component in Square Feet/OGSF) = 0.51

| | URBS COMPONENT EQUIVALENT | | SUBCOST | | |
|---|---|---|---|---|---|
| | Struct.-Ceil. | N. S. | | Cust. | Maint. |
| 1. 8" Concrete Block | 0.31 | | 0.31 | | |
| 2. 12" Concrete Block | 1.39 | | 1.39 | | |
| 3. Precast Spancrels | | 0.47 | 0.47 | | |
| 4. Windows & Screens | | 0.77 | 0.77 | L | H |
| 5. Glazing | | 0.47 | 0.47 | H | L |
| 6. Exterior Paint & Water-proofing | | 0.20 | 0.20 | L | H |
| 7. Interior Paint | | 0.05 | 0.05 | L | H |
| 8. Seismic Joint (not shown) | | 0.03 | 0.03 | | |
| 9. Rubber Base (not shown) | | 0.04 | 0.04 | L | L |
| 10. Doors & Storefront (not shown) | | 0.24 | 0.24 | H | H |
| | 1.70 | 2.27 | 3.97 | | |

Installed Cost Including Overhead & Profit $37,500 @ $4.59/square foot

## HEATING, VENTILATING AND AIR CONDITIONING COMPONENT COSTS (TYPE I BUILDINGS)

| | CONSTRUCTION COST | | OPERATING COST | URBS COMPONENT EQUIVALENT per O.G.S.F. | |
|---|---|---|---|---|---|
| | Per Resident | Per OGSF | | HVAC | Campus Central Plant |
| Priestly Hall, BERKELEY | $277 | $1.48 | H | $1.28<br>87% | Yes |
| Ryerson Hall, DAVIS | $529 | $2.45 | H | $2.12<br>87% | Yes (Heating) |
| Hedrick Hall, LOS ANGELES | ($404) | ($2.13) | L | $1.77<br>87% | No |
| Lothian Hall, RIVERSIDE | $727* | $4.41* | H | $3.81<br>87% | No |
| Revelle Hall, SAN DIEGO | $322 | $1.73 | L | $1.50<br>87% | Yes |

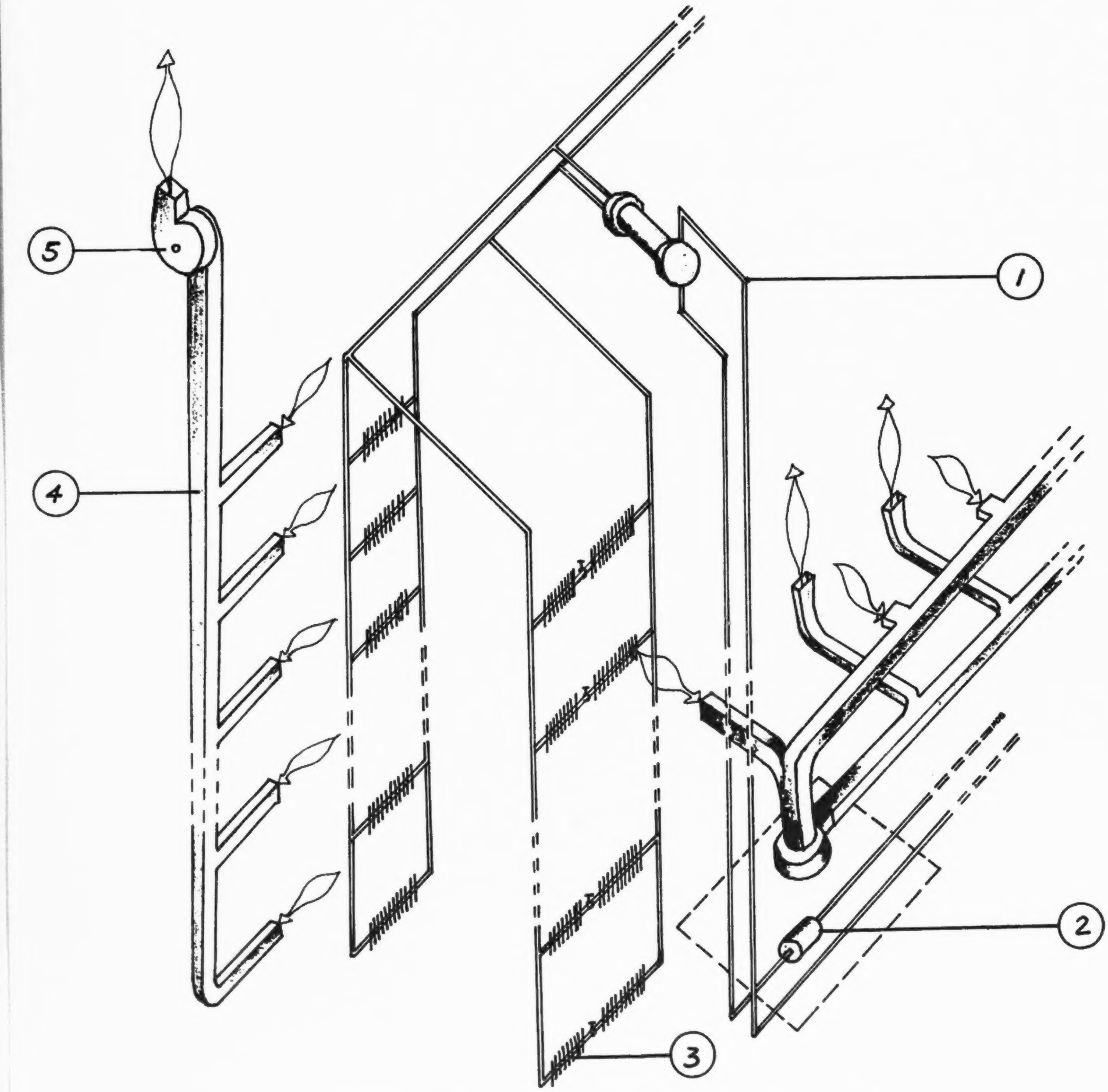
* High ( ) Median ______ Low

Lothian Hall is the only fully air-conditioned building studied. Its high speed induction units account for the most costly system. Ryerson Hall provides fan-coil heating and cooling units in each room, but does not supply air. Although both of these systems create a noticeable sound in the rooms, this has not been reported as objectionable. Hedrick Hall provides forced air, fresh or heated, to the rooms and has been subject to unbalance from student tampering with outlet grills. The other systems are hot-water connectors below windows and have reported frequent need for replacement of manual valves.

All of these systems, omitting general contractor's overhead and profit, are considered as replaceable by the URBS HVC component.

Priestly Hall is supplied by the campus steam plant, with a steam to water heat exchanger in the building. Ryerson Hall is supplied with steam to a mechanical building which distributes hot water to the coil units and makes its own chilled water. Hedrick Hall has its own gas-fired system. Lothian Hall has its own gas-oil plant. Revelle Hall receives hot water from a central plant in the dining commons.

Operating costs relate to the severity of the climatic conditions, as well as the efficiency of the heating and cooling plants.

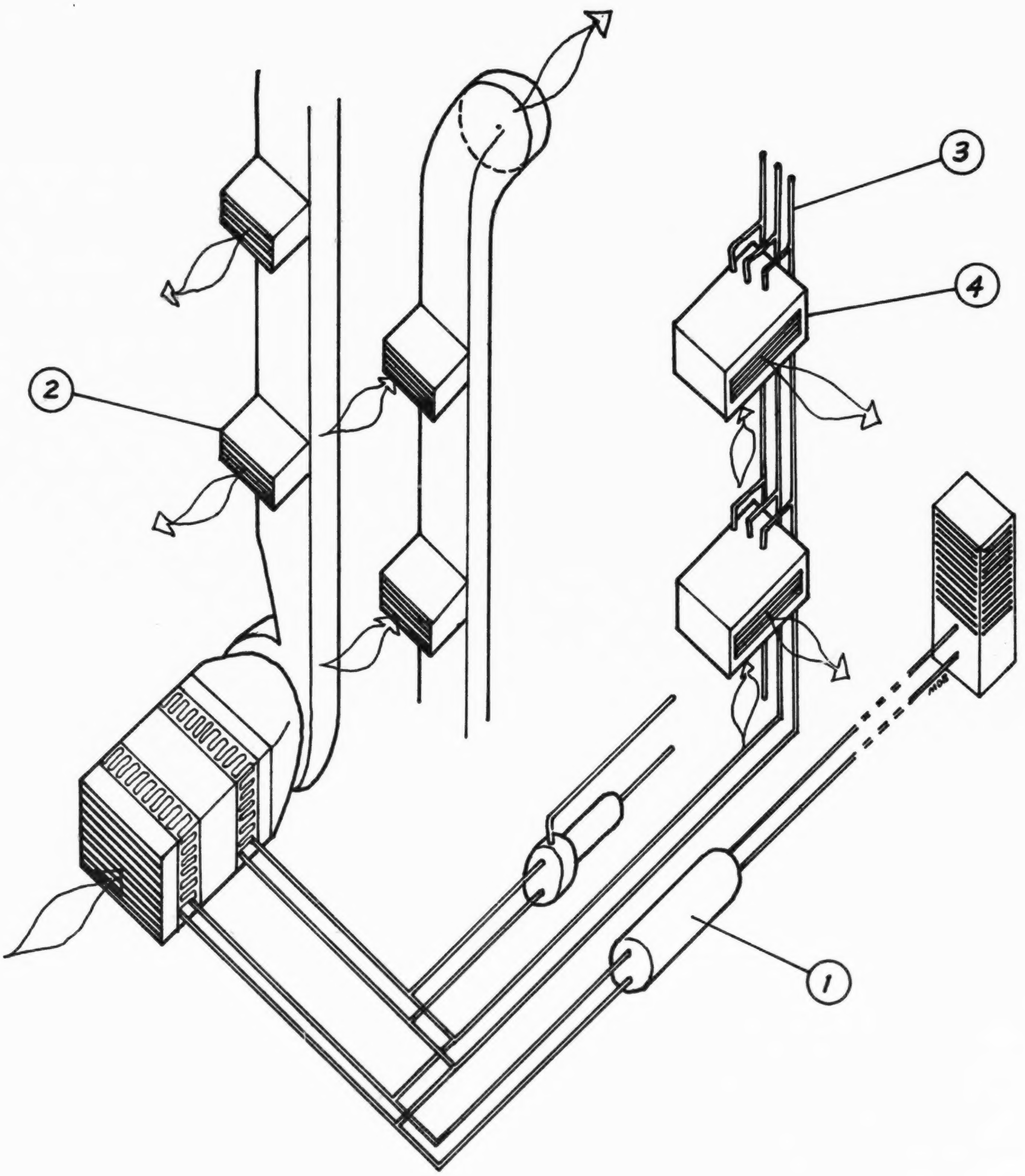


**HEATING & VENTILATING** 40,000 square feet = $53,464

| | URBS COMPONENT EQIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | HVC | | Cust. | Maint. |
| 1. Hot Water & Steam Piping | 0.16 | 0.16 | | L |
| 2. Mechanical Room Equipment | 0.31 | 0.31 | L | H |
| 3. Baseboard Convectors | 0.37 | 0.37 | L | H |
| 4. Ductwork - Bathrooms | 0.42 | 0.42 | | |
| 5. Roof Exhaust Fans | 0.02 | 0.02 | | L |
| | $1.28 | $1.28 | | |

Installed Cost Including Overhead & Profit $59,209 @ $1.48/square foot

RESIDENCE HALL NO. 3, PRIESTLY HALL, BERKELEY

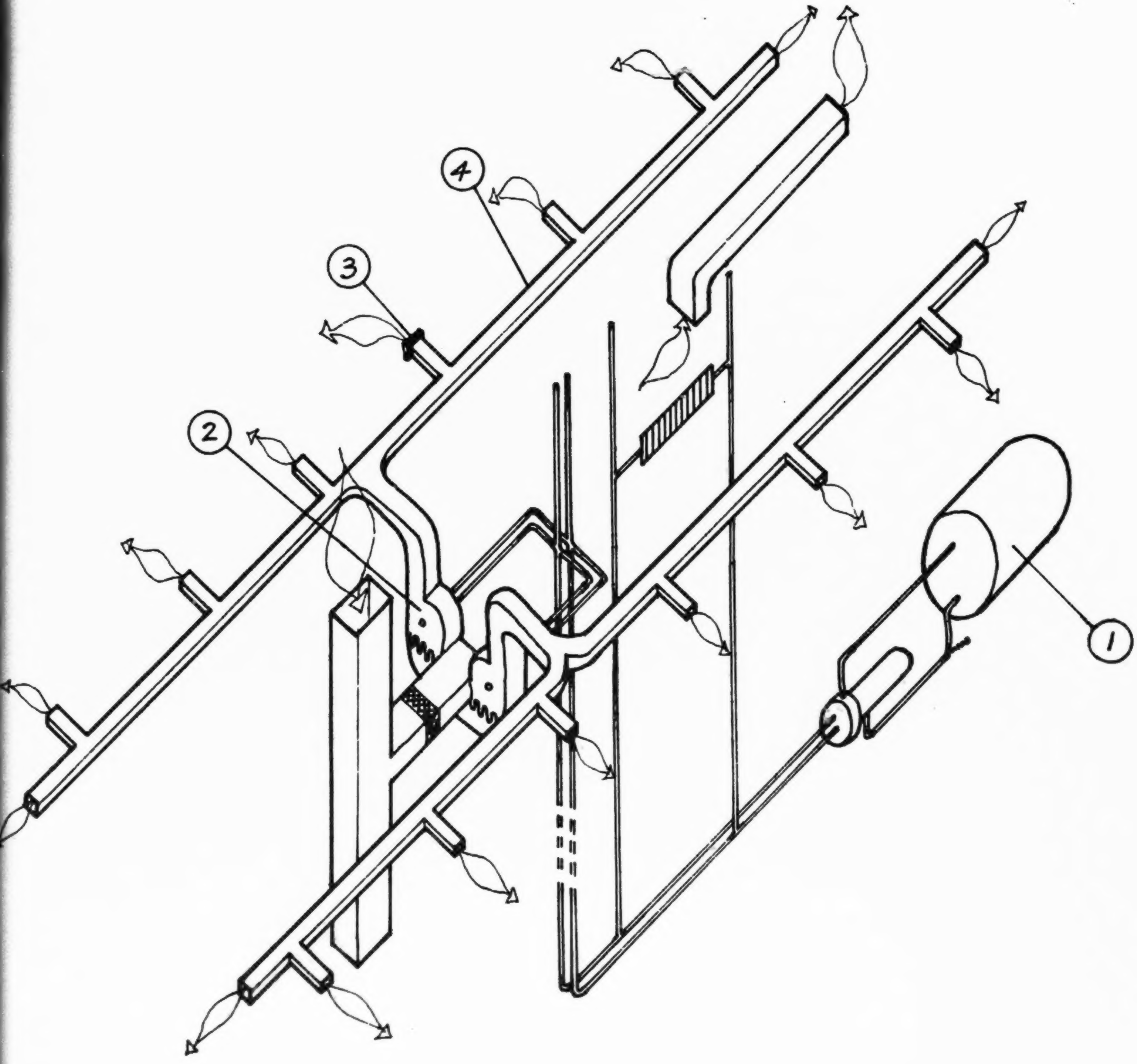


HEATING, VENTILATING, COOLING 44,000 sq. ft. = $ 93,392

| | URBS COMPONENT EQUIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | HVC | | Cust. | Maint. |
| 1. Mechanical | 0.36 | 0.36 | L | H |
| 2. Bathroom - Core, Fans and Ducts | 0.64 | 0.64 | | L |
| 3. Piping and insulation | 0.49 | 0.49 | | L |
| 4. Pan Coil Room Units | 0.63 | 0.63 | L | H |
| | 2.12 | 2.12 | | |

Installed Cost Including Overhead & Profit $107,867 @ $2.45/square foot

RESIDENCE HALL NO. 5, RYERSON, DAVIS

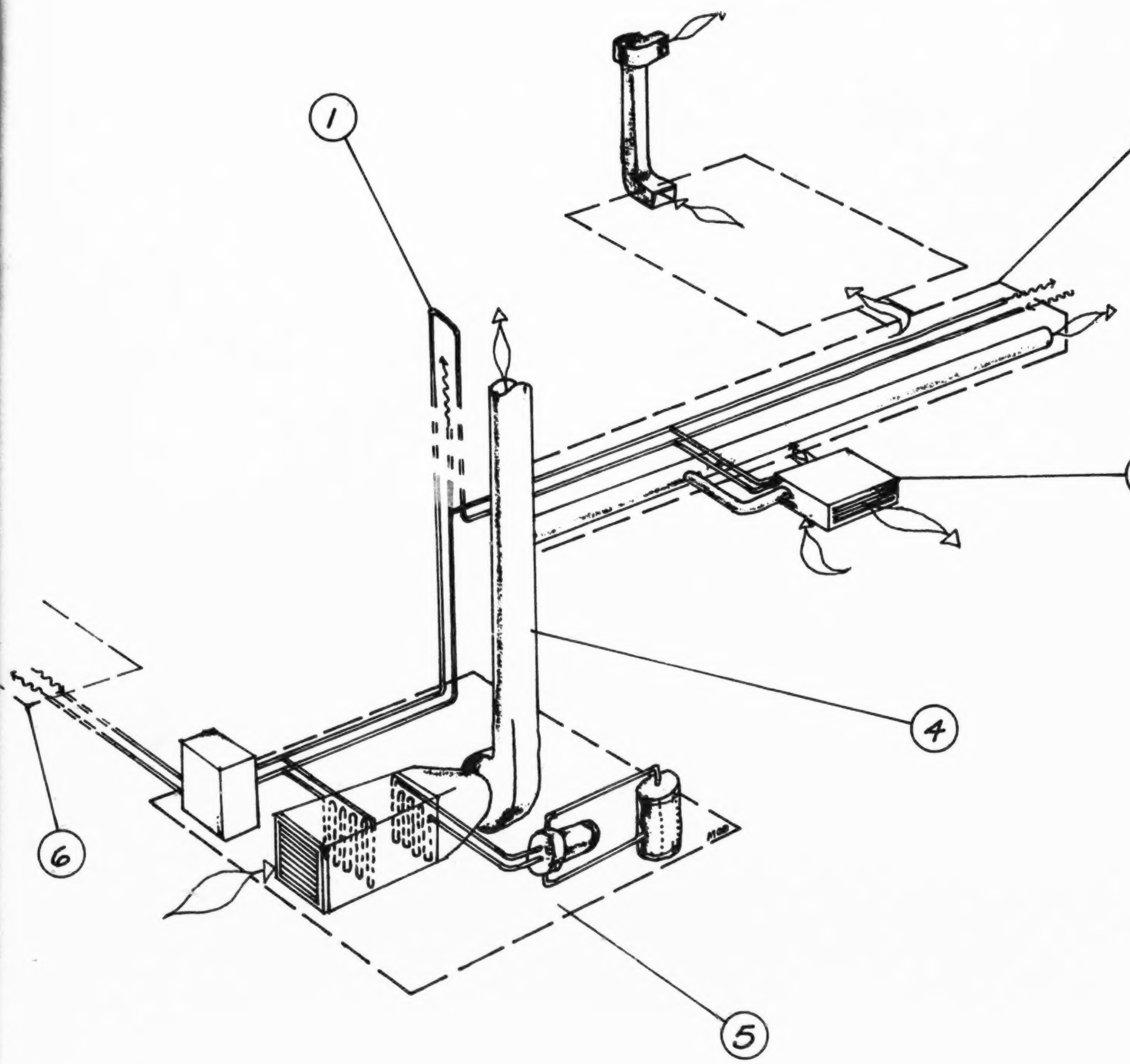


**HEATING & VENTILATING** 166,000 square feet = $292,620

| | URBS COMPONENT EQUIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | HVC | | Cust. | Maint. |
| 1. Boiler Room Equipment | 0.24 | 0.24 | L | H |
| 2. Floor Mechanical Rooms & Piping (towers) | 0.48 | 0.48 | L | H |
| 3. Floor Distribution - Except Ductwork (towers) | 0.11 | 0.11 | L | H |
| 4. Ductwork & Exhaust Fans (towers) | 0.65 | 0.65 | | L |
| 5. Lounge Heating & Ventilating (not shown) | 0.29 | 0.29 | L | L |
| | 1.77 | 1.77 | | |

Installed Cost Including Overhead & Profit $337,980 @ $2.03/square foot

RESIDENCE HALL NO. 4, HEDRICK HALL, LOS ANGELES

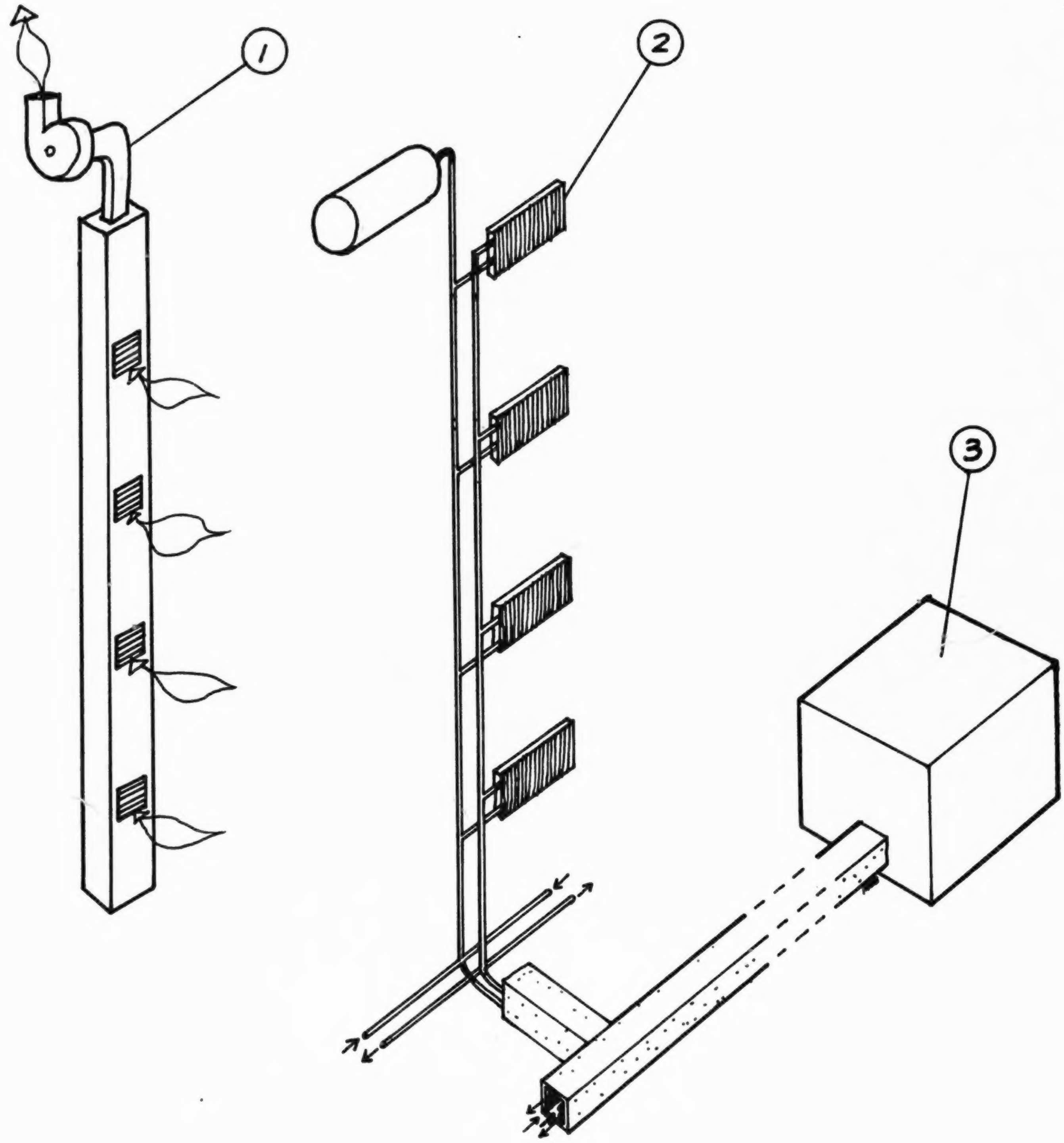


HEATING, VENTILATING AND COOLING 69,000 square feet = $265,495

| | URBS COMPONENT EQUIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | HVC | | Cust. | Maint. |
| 1. Chilled Water & Hot Water | 1.12 | 1.12 | | L |
| 2. Toilet & Corridor Ductwork | 0.38 | 0.38 | | |
| 3. Room Induction Units | 0.75 | 0.75 | | L |
| 4. Ductwork to Rooms | 0.45 | 0.45 | | |
| 5. Mechanical Room Equipment | 0.21 | 0.21 | L | H |
| 6. Cooling Tower, Etc. | 0.90 | 0.90 | L | H |
| | 3.81 | 3.81 | | |

Installed Cost Including Overhead & Profit $306,647 @ $4.41/square foot

RESIDENCE HALL NO. 4, LOTHIAN, RIVERSIDE



HEATING & VENTILATING 82,200 square feet = $123,050

| | URBS COMPONENT EQUIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | HVC | | Cust. | Maint. |
| 1. Bathroom Exhaust System | 0.38 | 0.38 | | L |
| 2. Hot Water Convector Heating System | 0.35 | 0.35 | L | H |
| 3. Heating Water Distribution | 0.77 | 0.77 | | L |
| | 1.50 | $1.50 | | |

Installed Cost Including Overhead & Profit $142,120 @ $1.73/square foot

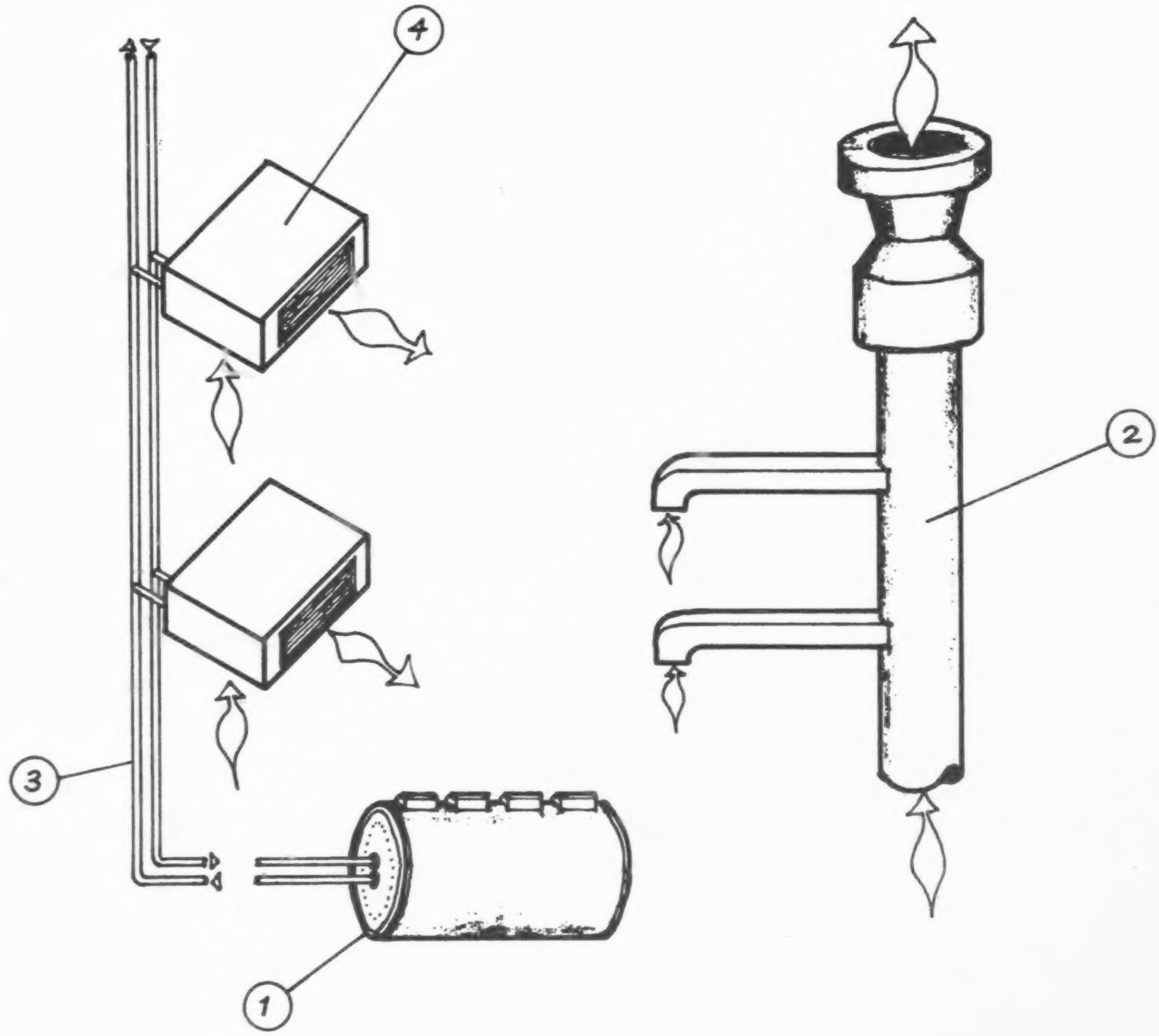
RESIDENCE HALL NO. 1, REVELLE HALL, SAN DIEGO

HEATING, VENTILATING AND AIR CONDITIONING COMPONENT COSTS (TYPE III - V BUILDINGS)

| | CONSTRUCTION COST | | OPERATING COST | URBS COMPONENT EQUIVALENT per O.G.S.F | |
|---|---|---|---|---|---|
| | Per Resident | Per OGSF | · | HVAC | Campus Central Plant |
| Regan Hall, DAVIS | $591* | $2.99* | H | $2.60<br>87% | Yes (Heating) |
| Mesa Court, IRVINE | $281 | $1.37 | L | $1.18<br>87% | No |
| Cowell College, SANTA CRUZ | $440 | ($1.93) | | $1.67<br>87% | No |
| Crown College, SANTA CRUZ | $292 | $1.13 | | $0.97<br>87% | No |
| Anacapa Hall, SANTA BARBARA | ($373) | $2.09 | L | $1.81<br>87% | No |

Regan Hall has a fan-coil system of heating and cooling similar to Ryerson Hall. It is the only building in this group that supplies cooling, and is the highest in cost. Crown College has a hot water convector system and is the lowest cost system in the group, although the electric cable ceiling radiant system at Mesa Court costs very little more. The hot-water floor radiant system at Cowell College is median in cost. Anacapa Hall has hot-water convectors, with a higher cost than Crown College because of its long horizontal runs.

Only Regan Hall uses a central plant, which is similar to that at Ryerson Hall. The high operating cost of Regan Hall reflects the heavy cooling load in its geographical location.

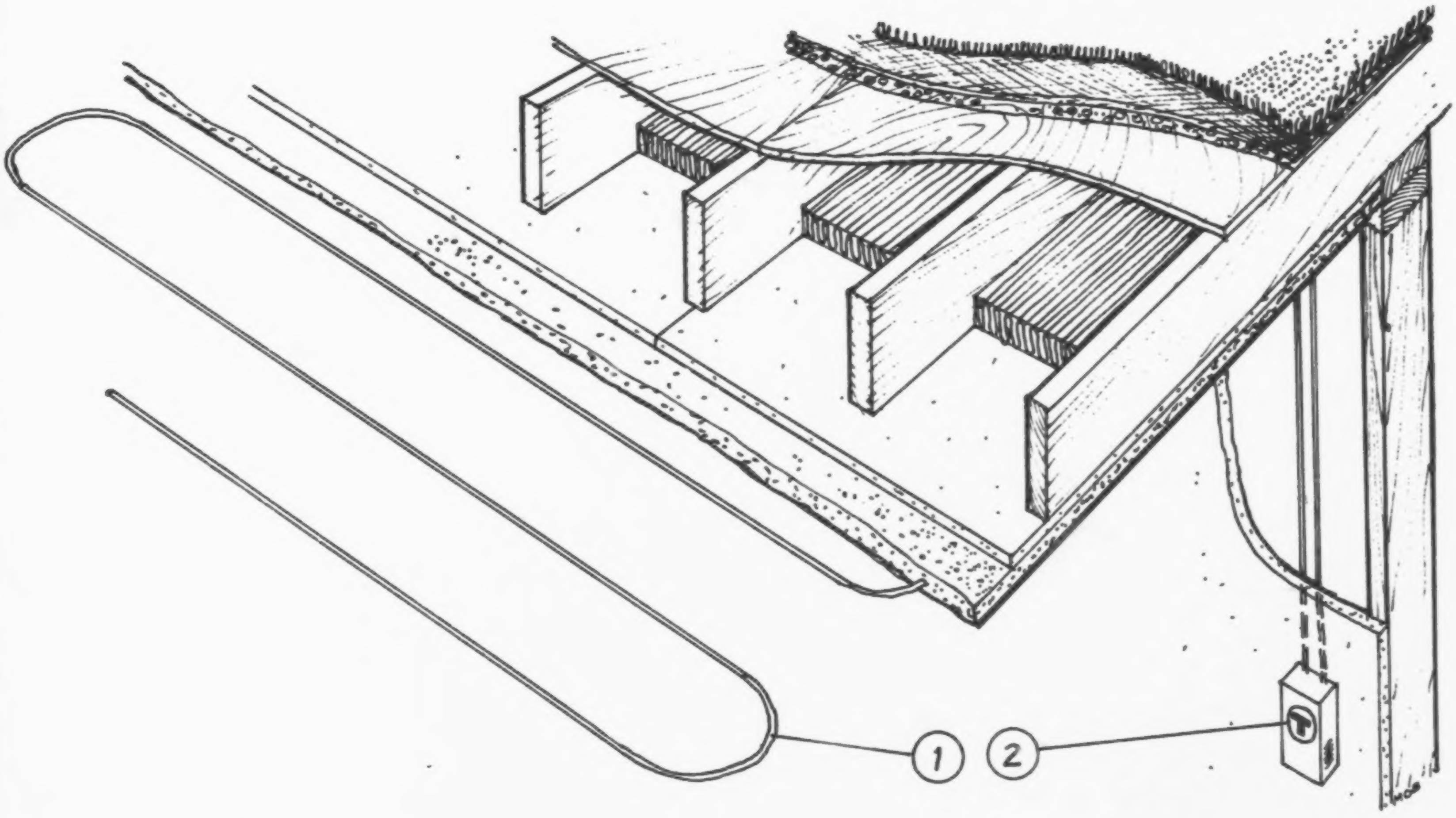


HEATING, VENTILATING AND COOLING 83,000 square feet = $215,826

| | URBS COMPONENT EQUIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | HVC | | Cust. | Maint. |
| 1. Mechanical Room Equipment | 0.61 | 0.61 | L | H |
| 2. Bathroom - Core Exhaust | 0.25 | 0.25 | | L |
| 3. Piping and Insulation | 0.72 | 0.72 | | L |
| 4. Fan Coil Room Units | 0.67 | 0.67 | L | H |
| 5. Central Building Air Conditioning (not shown) | 0.15 | 0.15 | L | L |
| 6. Underground Distribution (not shown) | 0.20 | 0.20 | | L |
| | 2.60 | 2.60 | | |

Installed Cost Including Overhead & Profit $248,200 @ $2.99/square foot

RESIDENCE HALL NO. 6, REGAN GROUP, DAVIS

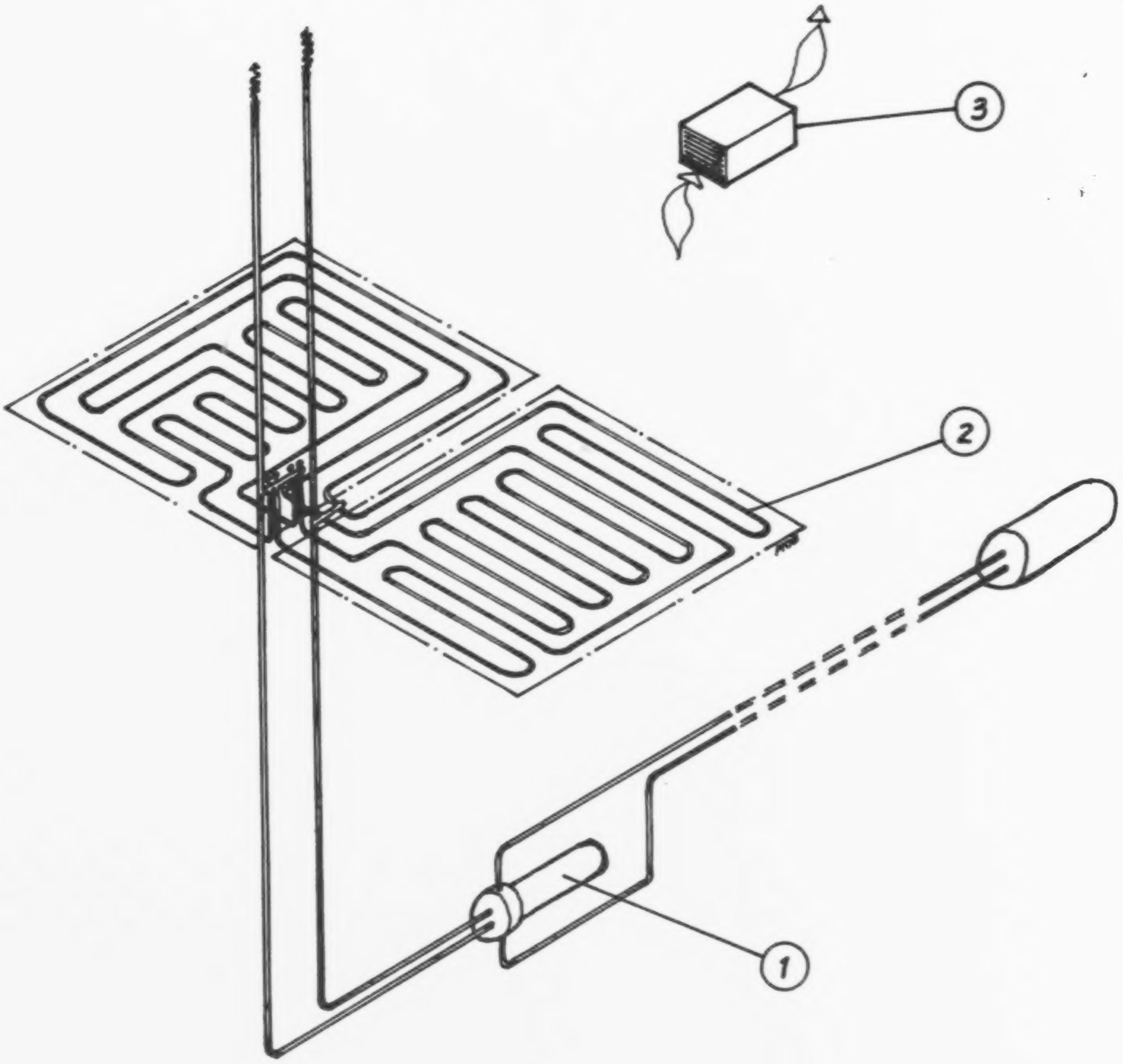


**HEATING** 83,400 square feet = $99,100

| | URBS COMPONENT EQUIVALENT HVC | SUBCOST | Maint. |
|---|---|---|---|
| 1. Cable, Conduit and Wire | 0.91 | 0.91 | |
| 2. Circuit Breaker & Panel (not shown) | 0.10 | 0.10 | L |
| 3. Thermostats | 0.17 | 0.17 | H |
| | 1.18 | $1.18 | |

Installed Cost Including Overhead & Profit $114,465 @ $1.37/square foot

RESIDENCE HALL NO. 1, MESA COURT, IRVINE

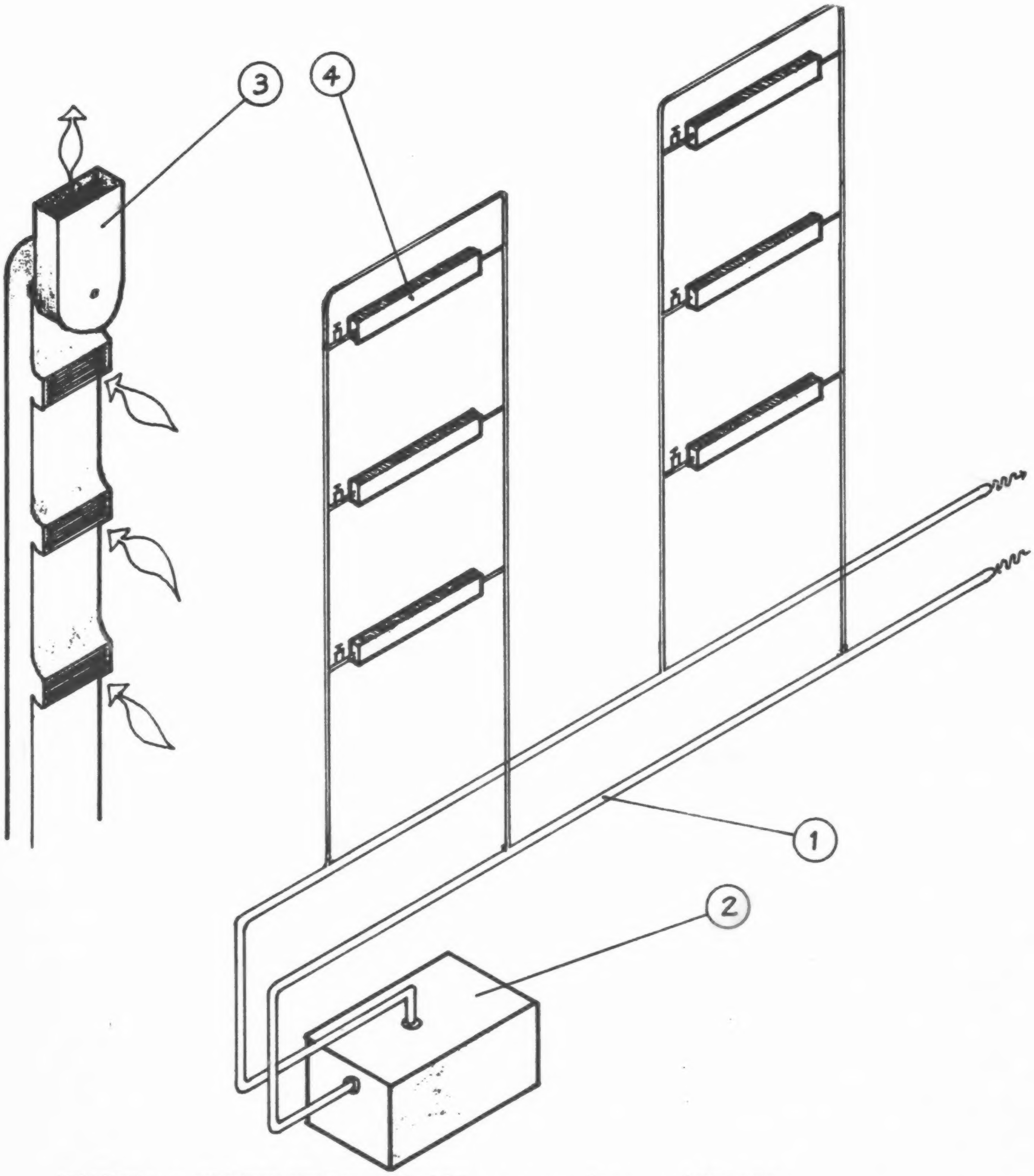


**HEATING & VENTILATING** 94,758 square feet = $158,430

| | URBS COMPONENT EQUIVALENT | SUBCOST | |
|---|---|---|---|
| | HVC | | Maint. |
| 1. Mechanical Room Equipment | 0.29 | 0.29 | H |
| 2. Radiant Piping and Insulation | 1.29 | 1.29 | L |
| 3. Bathroom Exhaust and Ductwork | 0.09 | 0.09 | L |
| | 1.67 | $1.67 | |

Installed Cost Including Overhead & Profit $182,987 @ $1.93/square foot

RESIDENCE HALL NO. 1, COWELL COLLEGE, SANTA CRUZ

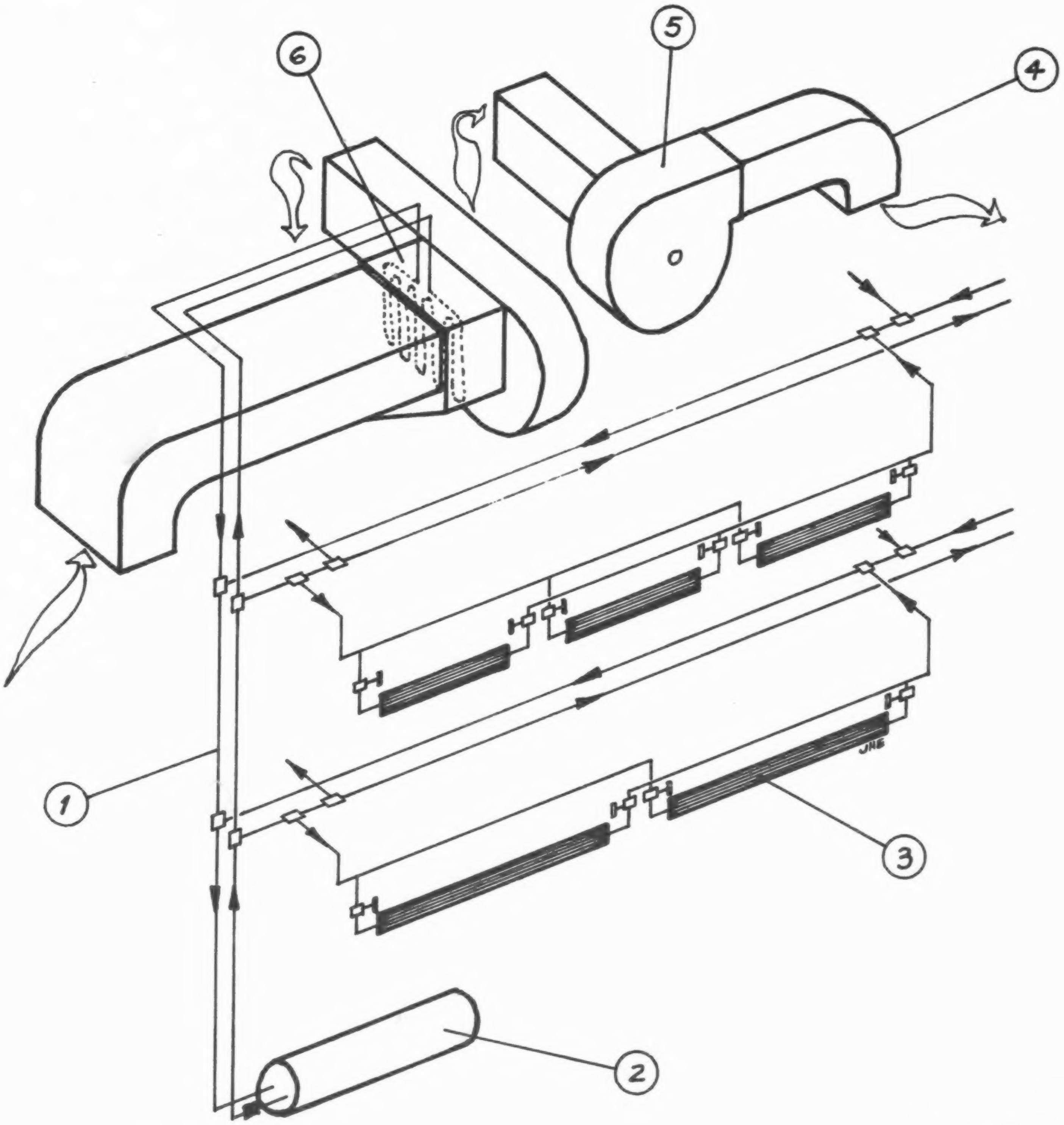


HEATING & VENTILATING 87,620 square feet = $85,360

| | URBS COMPONENT EQUIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | HVC | | Cust. | Maint. |
| 1. Hot Water Piping | 0.41 | 0.41 | | L |
| 2. Mechanical Room Equipment | 0.16 | 0.16 | | H |
| 3. Exhaust Fans & Ducts | 0.10 | 0.10 | | L |
| 4. Convectors, Controls | 0.30 | 0.30 | L | H |
| | 0.97 | $0.97 | | |

Installed Cost Including Overhead & Profit $98,590 @ $1.13/square foot

RESIDENCE HALL NO. 3, CROWN COLLEGE, SANTA CRUZ



**HEATING & VENTILATING** 75,000 square feet = $135,600

| | URBS COMPONENT EQUIVALENT | SUBCOST | | |
|---|---|---|---|---|
| | HVC | | Cust. | Maint. |
| 1. Hot Water & Steam Piping | 0.42 | 0.42 | | L |
| 2. Mechanical Room Equipment | 0.28 | 0.28 | | H |
| 3. Baseboard Convectors | 0.49 | 0.49 | L | H |
| 4. Ductwork | 0.46 | 0.46 | | |
| 5. Roof Exhaust Fans | 0.03 | 0.03 | | L |
| 6. Fan Coil to Lounges | 0.13 | 0.13 | | L |
| | 1.81 | 1.81 | | |

Installed Cost Including Overhead & Profit $156,750 @ $2.09/square foot

RESIDENCE HALL NO. 2, ANACAPA, SANTA BARBARA

## PLUMBING COMPONENT COSTS (TYPE I BUILDINGS)

| | CONSTRUCTION COST | | URBS COMPONENT EQUIVALENT per O.G.S.F. |
|---|---|---|---|
| | Per Resident | Per OGSF | Bathroom |
| Priestly Hall<br>BERKELEY | $299 | ($1.60) | $0.44 |
| Ryerson Hall<br>DAVIS | $366 | $1.56 | $0.41<br>26% |
| Hedrick Hall<br>LOS ANGELES | ($307) | $1.55 | $0.42<br>27% |
| Lothian Hall<br>RIVERSIDE | $303 | $1.84 | $0.41<br>22% |
| Revelle Hall<br>SAN DIEGO | $390* | $2.10 | $0.49<br>23% |

* High ( ) Median _____ Low

Variance in plumbing costs relates to the quality and dispersal of fixtures. Revelle Hall, the highest in unit cost, has ten residents per bath, whereas Hedrick Hall has 34 residents.

The URBS equivalent component cost is based upon the installed cost of fixtures plus a $25.00 allowance for each fixture to attach it to branch plumbing lines.

## PLUMBING COMPONENT COSTS (TYPE III -V BUILDINGS)

| | CONSTRUCTION | | URBS COMPONENT EQUIVALENT per O.G.S.F. |
|---|---|---|---|
| | Per Resident | Per OGSF | Bathroom |
| Regan Hall, DAVIS | $298 | $1.51 | $0.35<br>23% |
| Mesa Court, IRVINE | $471 | $2.30* | $0.53<br>23% |
| Cowell College, SANTA CRUZ | $512* | $2.25 | $0.42<br>19% |
| Crown College, SANTA CRUZ | ($426) | $1.94 | $0.46<br>24% |
| Anacapa Hall, SANTA BARBARA | $350 | ($1.96) | $0.41<br>21% |

* High ( ) Median _____ Low

The plumbing allocation for the URBS component equivalent for this group of buildings is based upon the same assumptions as for Type I. Mesa Court has one bathroom for every eight or nine residents, Regan Hall has one for every 25 residents.

ELECTRICAL COMPONENT COSTS (TYPE I BUILDINGS)

| | CONSTRUCTION COST (ALLOWANCES) | | URBS COMPONENT EQUIVALENT (NONE) |
|---|---|---|---|
| | Per Resident | Per OGSF | |
| Priestly Hall<br>BERKELEY | ($216) | $1.16 | |
| Ryerson Hall<br>DAVIS | $249* | $1.16 | |
| Hedrick Hall<br>LOS ANGELES | $229 | $1.16 | |
| Lothian Hall<br>RIVERSIDE | $190 | $1.16 | |
| Revelle Hall<br>SAN DIEGO | $215 | $1.16 | |

* High ( ) Median ____ Low

Because there is little variation in the electrical installations, an allowance of a sub-cost of $1.00 per O.G.S.F. was utilized. This approximates $33.00 an outlet, including fixtures, for the complete electrical installation in each building. No URBS component equivalents are involved.

## ELECTRICAL COMPONENT COSTS (TYPE III - V BUILDINGS)

| | CONSTRUCTION COST | | URBS COMPONENT EQUIVALENT (NONE) |
|---|---|---|---|
| | Per Resident | Per OGSF | |
| Regan Hall<br>DAVIS | $228 | $1.16 | |
| Mesa Court<br>IRVINE | ($236) | $1.16 | |
| Cowell College<br>SANTA CRUZ | $262* | $1.16 | |
| Crown College<br>SANTA CRUZ | $253 | $1.16 | |
| Anacapa Hall<br>SANTA BARBARA | $206 | $1.16 | |

* High ( ) Median _____ Low

This group of buildings is considered in the same way as the Type I group. The electrical heating system at Mesa Court was estimated independently and is included in the HVC category.

## ELEVATOR COMPONENT COSTS (TYPE I BUILDINGS)

| | CONSTRUCTION COST (ALLOWANCES) | | URBS COMPONENT EQUIVALENT (NONE) |
|---|---|---|---|
| | Per Resident | Per OGSF | |
| Priestly Hall, BERKELEY | $243* | $1.30* | |
| Ryerson Hall, DAVIS | ($142) | ($0.66) | |
| Hedrick Hall, LOS ANGELES | $221 | $1.11 | |
| Lothian Hall, RIVERSIDE | $109 | ($0.66) | |
| Revelle Hall SAN DIEGO | - | - | |

* High ( )Median ______ Low

Elevators, not included in the URBS Performance Specifications, are herein included based upon an allowance of $5,000 per landing per elevator.

## BATHROOM COSTS PER STUDENT

The URBS Performance Specifications for the Bathrooms Component include:

1. All bathroom fixtures.
2. Water supply, drain, waste and vent branch plumbing directly related to bathrooms.
3. Bathroom floor surfaces.
4. Interior wall surfaces within the basic bathroom enclosure.
5. Ceiling surfaces.
6. Lighting and Electrical fixtures, supplied but not installed.
7. Accessories, shelves, mirrors, robe hooks, cabinets.
8. Heating and ventilating grills and diffusers.

Not included are:

1. Peripheral partition structure.
2. Entry doors.
3. Heating, ventilating and air-conditioning ductwork, wiring and piping.
4. Plumbing other than bathroom supply and waste branches.

Bathroom costs for the URBS Bathrooms Component equivalents of the projects studied are recapitulated below:

| | Residents per Bathroom | Bathroom Cost ($) | Bathroom Cost ($ per Resident) |
|---|---|---|---|
| Priestly Hall<br>BERKELEY | 28 | $ 8,540 | $305 |
| Ryerson Hall<br>DAVIS | 26 | $ 8,372 | $322 |
| Hedrick Hall<br>LOS ANGELES | 34 | $ 6,528 | $192 |
| Lothian Hall<br>RIVERSIDE | 40 | $11,600 | $292 |
| Revelle Hall<br>SAN DIEGO | 10 | $ 2,120 | $212 |
| Regan Hall<br>DAVIS | 25 | $ 5,350 | $214 |
| Mesa Court<br>IRVINE | 8 | $ 1,800 | $225 |
| Cowell College<br>SANTA CRUZ | 11 | $ 3,729 | $339 |
| Crown College<br>SANTA CRUZ | 16 | $ 4,736 | $296 |
| Anacapa Hall<br>SANTA BARBARA | 51 | $ 9,600 | $188 |

## STUDY-BEDROOM FURNISHINGS PER STUDENT

The URBS Performance Specifications for Furnishings include storage units with drawers and shelves, desks, screens, beds, chairs, lighting fixtures and room accessories. The cost estimates of furnishings in this study include only those elements which were a part of the general construction contract for each building.

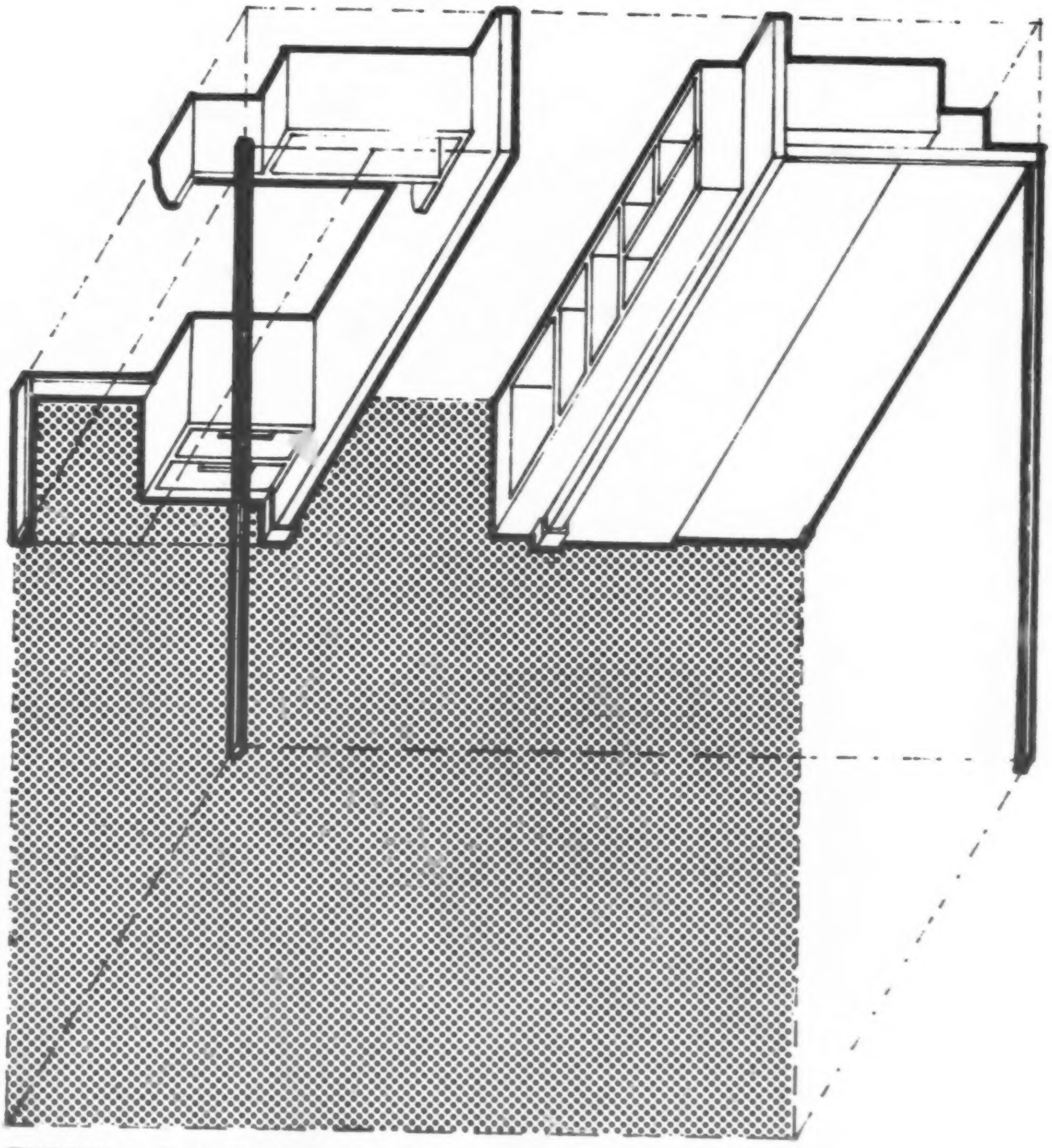
This section illustrates those elements supplied under the building contract for double student study bedrooms in each of the ten projects. The estimated cost per student for each installation is also shown. A wide range is noted between the built-in desk-bed-wardrobe units at Revelle Hall and at Hedrick Hall and the simple wardrobe arrangements in Cowell College and Mesa Court.

The URBS program will include many elements such as chairs, beds and desks which are normally included as Type 2 and 3 equipment in the University of California projects.

STUDENT BEDROOM STORAGE AND FURNISHINGS

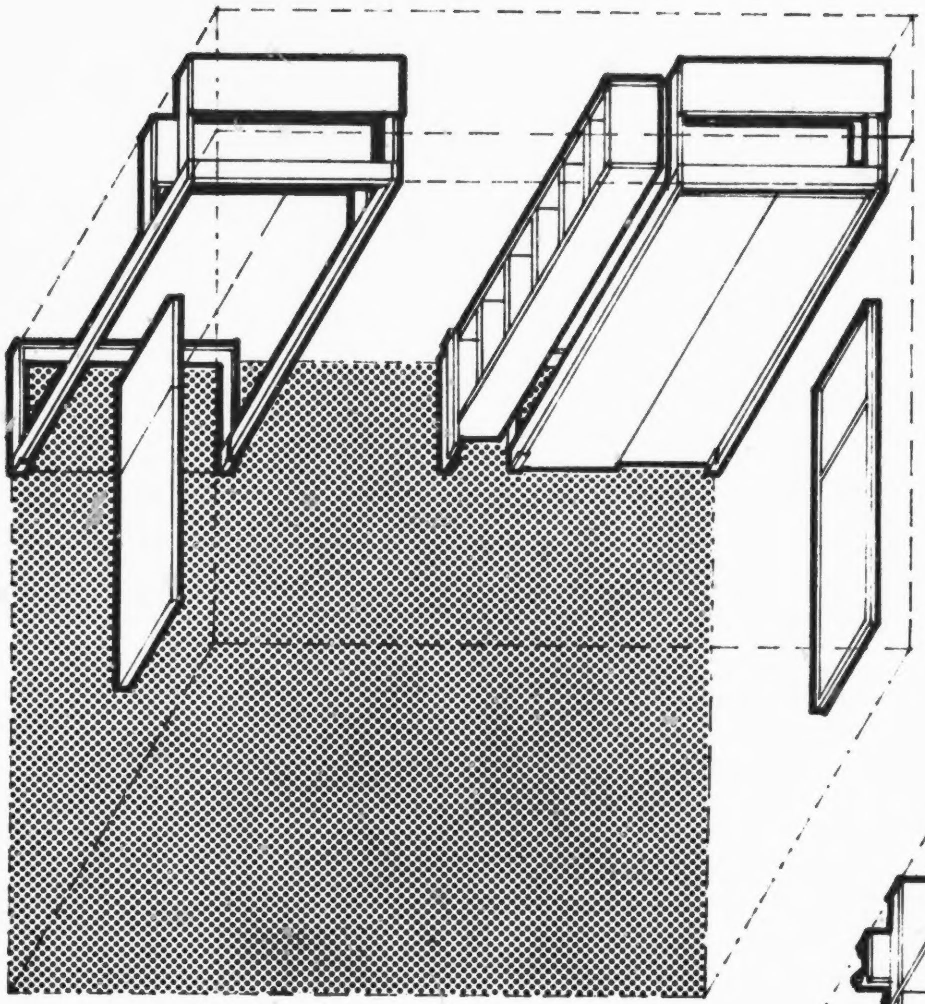
Residence Hall No. 3,
Priestly, BERKELEY

| | |
|---|---|
| Wardrobe | $140 |
| Total Cost Per Student | $140 |



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #3, Priestly Hall, BERKELEY



STUDENT BEDROOM
STORAGE AND FURNISHINGS
R.H. #5, Ryerson, DAVIS
(R.H. #6, Regan, DAVIS similar)

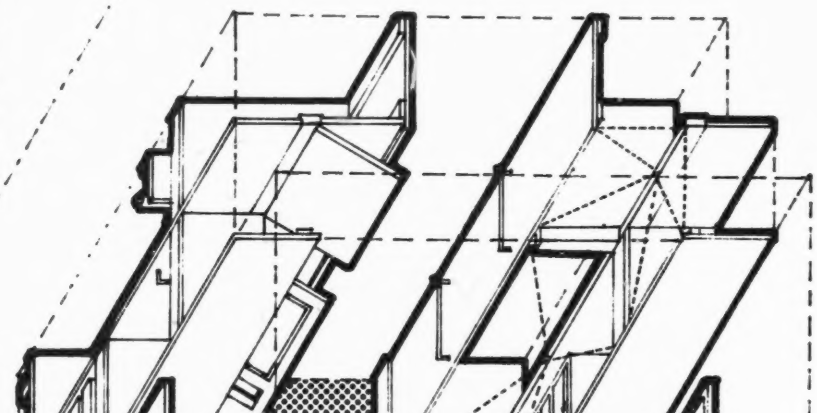
| | |
|---|---|
| Wardrobe | $100 |
| Tackboard and Mirror | $ 20 |
| Bookshelves | $ 30 |
| Total Cost Per Student | $150 |

TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #5, Ryerson Hall, DAVIS

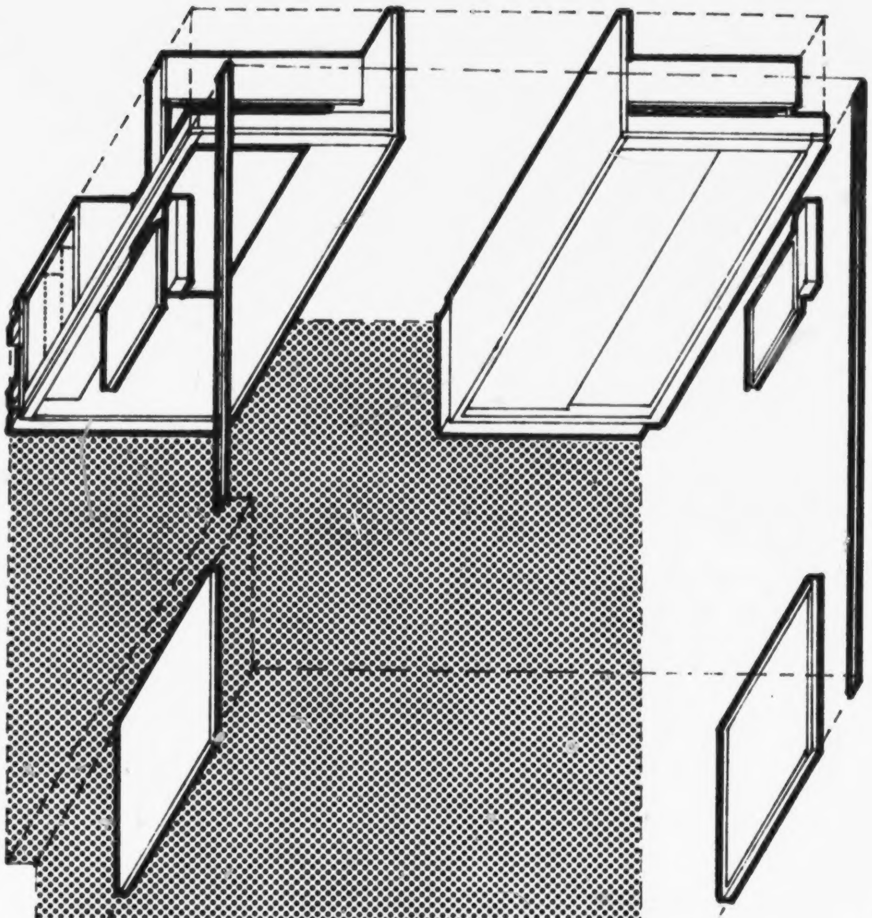
STUDENT BEDROOM
STORAGE AND FURNISHINGS
Residence Hall #4,
Hedrick, LOS ANGELES

| | |
|---|---|
| Bolster Bed | $100 |
| Wardrobe | $120 |
| Desk | $100 |
| Tackboard and Chalkboard | $ 20 |
| Wardrobe Light | $ 10 |
| Total Cost Per Student | $350 |



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #4, Hedrick Hall, LOS ANGELES



TYPICAL RESIDENCE FLOOR PLAN

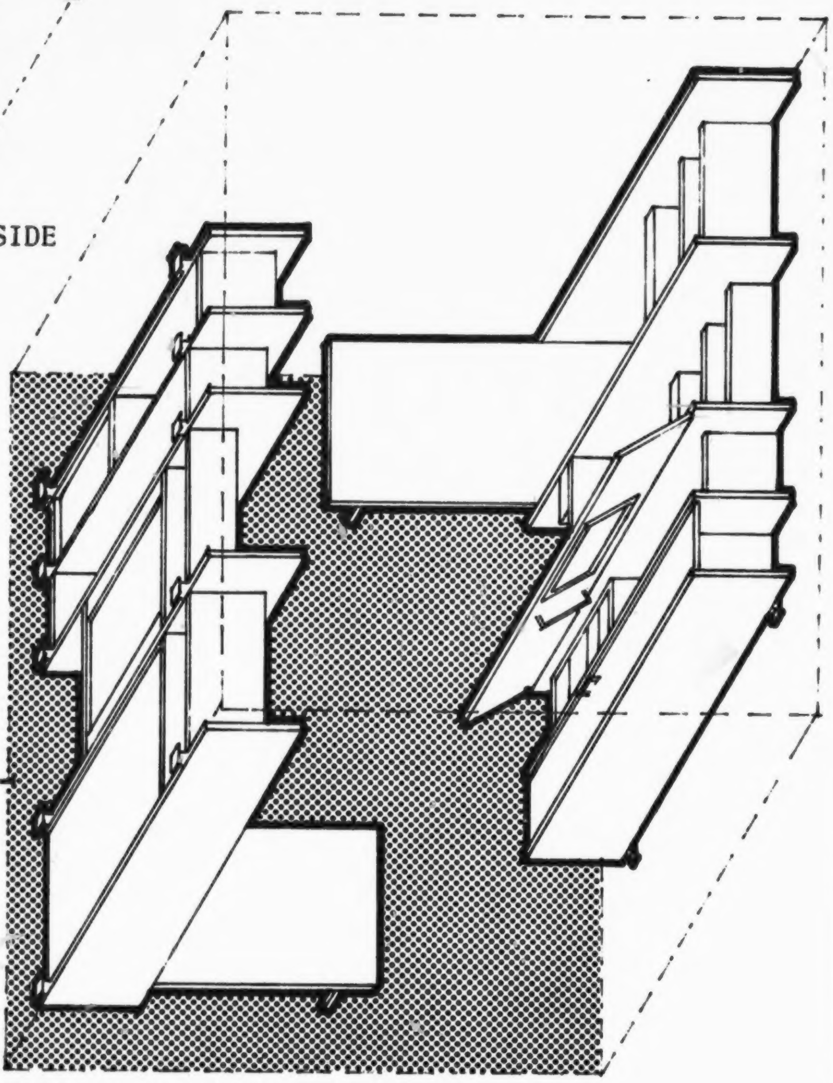
Residence Hall #4, Lothian Hall, RIVERSIDE

STUDENT BEDROOM
STORAGE AND FURNISHINGS
R. H. #4, Lothian, RIVERSIDE

| | |
|---|---|
| Wardrobe ................ | $165. |
| Tackboard................ | $ 15. |
| Mirror................... | $ 10. |
| Mirror Light............. | $ 20. |
| Total Cost Per Student | $210. |

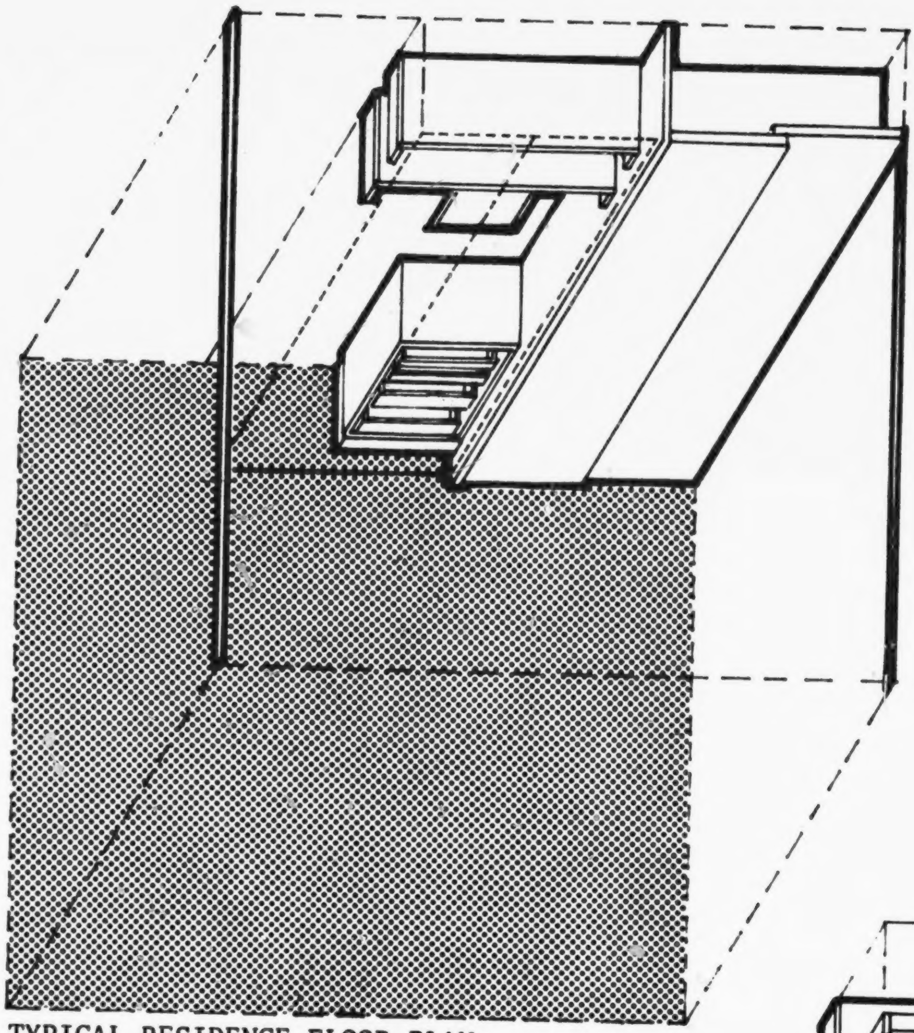
STUDENT BEDROOM
STORAGE AND FURNISHINGS
R. H. #1, Revelle, SAN DIEGO

| | |
|---|---|
| Wardrobe unit including<br>Wardrobe, Bed, Desk, Mirror,<br>and Mirror Light ........... | $335. |
| Total Cost Per Student | $335. |



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #1, Revelle Hall, SAN DIEGO



STUDENT BEDROOM
STORAGE AND FURNISHINGS
R. H. #1, Mesa Court, IRVINE

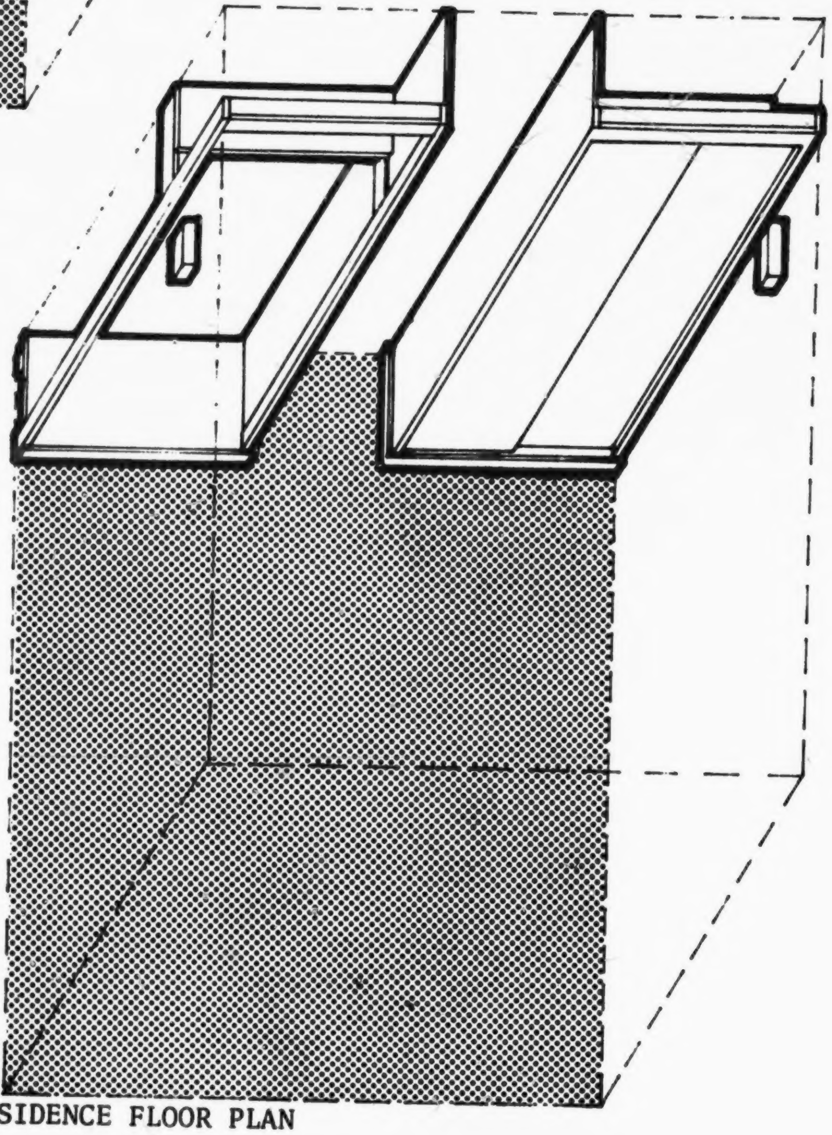
| | |
|---|---|
| Wardrobe................ | $120. |
| Mirror.................. | $ 10. |
| Total Cost Per Student | $130. |

TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #1, Mesa Court, IRVINE

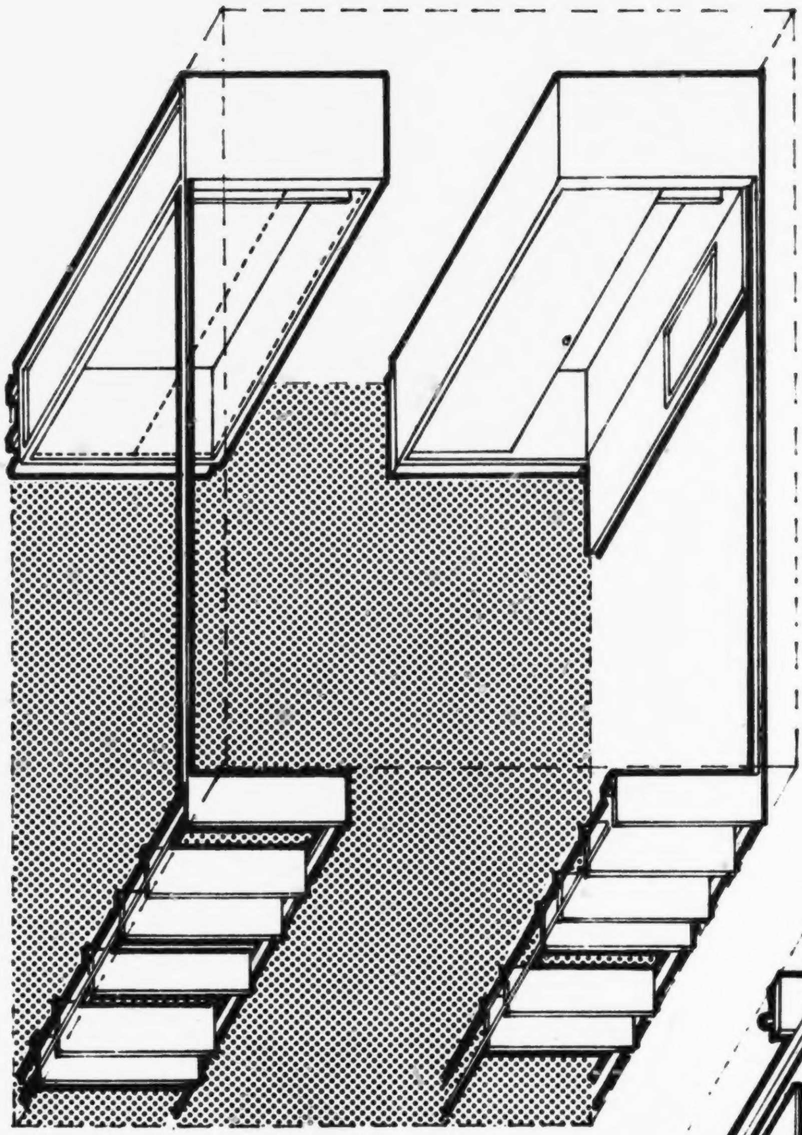
STUDENT BEDROOM
STORAGE AND FURNISHINGS
R. H. #1, Cowell, SANTA CRUZ

| | |
|---|---|
| Wardrobe................ | $100. |
| Light................... | $ 20. |
| Total Cost Per Student | $120. |



TYPICAL RESIDENCE FLOOR PLAN

Residence College #1, Cowell College, SANTA CRUZ



TYPICAL RESIDENCE FLOOR PLAN

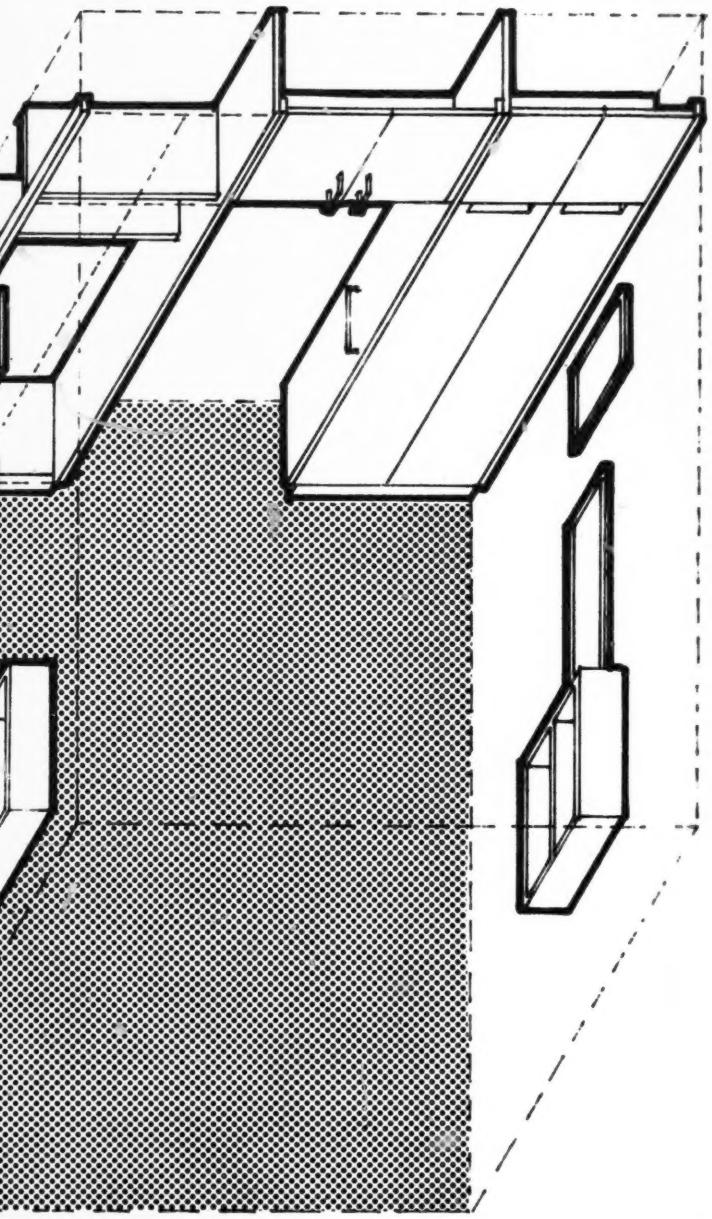
Residence College #3, Crown College
SANTA CRUZ

STUDENT BEDROOM
STORAGE AND FURNISHINGS
R.H. #3, Crown, SANTA CRUZ

| | |
|---|---|
| Wardrobe ................ | $125. |
| Bookshelves ............ | $ 20. |
| Mirror.................... | $ 10. |
| Total Cost Per Student | $155. |

STUDENT BEDROOM
STORAGE AND FURNISHINGS
R.H. #2, Anacapa, SANTA BARBARA

| | |
|---|---|
| Wardrobe................ | $135. |
| Bookcase................ | $ 20. |
| Mirror.................. | $ 10. |
| Tackboard............... | $ 10. |
| Total Cost Per Student | $175. |



TYPICAL RESIDENCE FLOOR PLAN

Residence Hall #2, Anacapa Hall, SANTA BARBARA